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BULLETIN OF THE HISTORY OF MEDICINE

ORGAN OF
THE AMERICAN ASSOCIATION FOR THE HISTORY OF MEDICINE
AND OF
THE JOHNS HOPKINS INSTITUTE OF THE HISTORY OF MEDICINE

VOLUME XXXV JULY–AUGUST, 1961 NUMBER 4

A SEVENTEENTH CENTURY VIEW OF MENTAL DEFICIENCY AND SCHIZOPHRENIA: THOMAS WILLIS ON "STUPIDITY OR FOOLISHNESS"

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Near the end of his life, Thomas Willis (1621-1675)[2] published a long book which is of great interest in the history of psychiatry. This book, *De anima brutorum*,[3] has often been brushed aside because at one point in it Willis recommended brutal therapy for patients suffering from chronic mania. It has been pointed out that this aspect of the book is atypical and that there is in it a great deal which deserves examination.[4] Among other things, *De anima brutorum* contains an entire chapter on the subject of mental deficiency. This is not the earliest systematic discussion of mental deficiency known, but it is an early one. It con-

[1] This paper is based upon research supported by a grant to the author from the National Institutes of Mental Health (Grant M-3869). The paper was prepared while the author was Senior Post-Doctoral Fellow in the Department of Psychiatry of the Albert Einstein College of Medicine on Interdisciplinary Grant 2M-6418, National Institutes of Health, Public Health Service.

[2] A useful biography of Willis is found in William Snow Miller, "Thomas Willis (1621-1675)," *Bull. Soc. M. Hist. Chicago*, 1923, *3*: 215-232.

[3] Thomas Willis, *De anima brutorum*, Oxonii: R. Davis, 1672. The Latin text of Willis's chapter on stupidity gained a wide circulation by being reprinted *in toto* in J. J. Manget, *Bibliotheca medico-practica*, Geneva: Chouet, vol. 4, 1698, pp. 581-586.

[4] J. Vinchon and J. Vie, Un maître de la neuropsychiatrie au XVII[e] siècle: Thomas Willis (1662-1675). *Ann. méd. psychol.*, 1928, Series 12, *2*: 108-144. This study is the only survey of the entire *De anima brutorum* which I have located.

tains so many interesting observations, among them a description of schizophrenia, that it seems desirable to reprint the chapter with a fairly detailed commentary.

The title of Willis's book, *De anima brutorum*, or, as it was called in a contemporary translation, *Two Discourses on the Soul of Brutes*,[5] may seem a little obscure. The title and the concept which it represents are in fact taken directly from the philosophical writings of Pierre Gassendi (1592-1655).[6] Gassendi claimed that animals must have souls since they show evidence of memory, reason, and similar traits. This soul, the soul of brutes, is also present as an inferior soul in humans in whom it is subservient to the superior or rational soul. The soul of brutes is a material substance extended equally with the body; it is corporeal, material, and mortal. The rational soul is, of course, immaterial and immortal. In examining the function and properties of the animal soul, Willis is able to present a coherent psychological and physiological approach to the problems of psychiatry without infringing too much upon the area of religion which is concerned with the rational and immortal soul. Willis's psychology[7] and physiology were, perhaps, primitive; but he combined anatomy, physiology, psychology, and clinical observation in a systematic way and this gives his work a satisfying quality. On the

[5] Thomas Willis, *Two Discourses Concerning the Soul of Brutes, which is that of the vital and sensitive of man. The first is physiological, shewing the nature, parts, powers, and affections of the same. The other is pathological, which unfolds the diseases which affect it and its primary seat; to wit the brain and nervous stock, and treats of their cures.* Englished by S. Pordage. London: Dring, Harper, and Leigh, 1683. This translation was reprinted, apparently from the same type and certainly with the same pagination, in *Dr. Willis' Practice of Physick*, London: Dring, Harper, and Leigh, 1684. I have cited the original text as *De anima brutorum* and the translation as *Two Discourses*.

[6] Willis frequently cites Gassendi in his preface and text. My source of knowledge of the opinions of Gassendi is G. S. Brett, *The Philosophy of Gassendi*, New York: Macmillan, 1908. Dr. Walter Federn informs me that a lively dispute about the "soul of Brutes" had arisen very early in the seventeenth century as the result of the charges of heresy brought against Daniel Sennert (1572-1637), who was accused of having attributed to animals a soul which too nearly resembled the immortal soul of man. A review of that controversy can be found in the article on Sennert in Bayle's *Dictionnaire historique et critique*, Rotterdam, 1702, vol. 3, pp. 2699-2703.

[7] The word *psychologia* appears frequently in Greek in Willis's Latin text. Pordage usually translates it as "doctrine of the soul" but, on at least one occasion, he translates it as "psycheology": ". . . we search into what parts powers, and affections she [i.e., the soul of the brute] has, which shall be the chief Members of our Psycheology or Discourse of the Soul." (*Two Discourses*, p. 18.) This may be the first use of the word psychology in the English language. It antedates by ten years the earliest English usage given in the Oxford English Dictionary.

one hand, comparative anatomy is presented in the book as an introduction to the anatomy of the human brain. There are plates showing the anatomy of the central nervous system of the silkworm, the grasshopper, the oyster, the lobster, the earthworm, and the sheep. On the other hand, in the same book, Willis gives what is generally accepted as the first identifiable clinical description of general paresis of the insane. It is not surprising, therefore, that the chapter on mental deficiency includes observations which range from the biological to the psychological.

The chapter itself follows, in the contemporary (1683) translation of Samuel Pordage.[8] The complexities of the theories which Willis used are elucidated, to some extent, in the commentary which concludes the present paper. To facilitate reference to the chapter, each paragraph has been identified by a letter. The numbers which head some paragraphs are part of the original text. The sentences which stand alone in parentheses are the hanging marginal notes of the original text, here run-in and italicized in the interest of typographical economy. The text is reproduced verbatim and, therefore, includes a few peculiarities of spelling and usage, some of which may have been typographical errors. I did not check every oddity against seventeenth century usage. The style has a certain charm which I did not wish to lose by modernization of the translation.

Two Discourses concerning the Soul of Brutes

Chap. XIII

Of Stupidity, or Foolishness

(A.) *Stupidity*, or *Morosis*,[9] or Foolishness, although it most chiefly belongs to the Rational Soul, and signifies a defect of the Intellect and Judgment, yet it is not improperly reckoned among the Diseases of the Head or Brain; forasmuch as this *Eclipse* of the superior soul, proceeds from the Imagination and the Memory being hurt, and the failing of these depends upon the faults of the Animal Spirits, and the Brain it self.

(*Stupidity arises chiefly from the failing of the Imagination and Memory.*)

(B.) We have before clearly shewed, that the Rational Soul doth subsist in a sensitive or corporeal Soul, and that its principal seat is the

[8] Samuel Pordage (1633-1691) was a seventeenth century poetaster and playwright. A biographical sketch of him is found in *The Dictionary of National Biography*, Oxford University Press, 1921-1922, vol. 16, pp. 151-152.

[9] This word appears in Greek in the Latin text.

Imagination: Further from *this,* and the *Memory,* either the notions themselves, or their occasions of all things are supplied, which the Mind beholds; wherefore, when it happens that these Corporeal Functions are defective or hindred, forthwith the eye of the Intellect, as if covered with a vail, is wont to be very much dulled, or wholly darkned. Therefore, that the reason of *Foolishness* and *Stupidity* may be rightly delivered, first we ought to inquire by what means, and from what causes, the *Imagination* and the *Memory* are often defective or fore-hindred.

(*Wherefore the Organs of these Faculties labour in this Disease.*)

(C.) That we may proceed methodically, concerning these, hither ought to be referred, what we have discoursed before concerning the Functions of the Corporeal Soul, and their subjects and instruments. We have at large declared that the *Callous* Bodies, or the middle of the Brain is the seat of the *Imagination*; and the Cortical Marrows of the Brain, the seat of the *Memory*; and further, that the Animal Spirits are the immediate organs of either. Wherefore, because their powers being hindred (which are the first or chief movers of any other Function, both rational and sensitive) the Imbecility and dulness of the mind, the slowness of the ingenuity, stupidity and madness at length do often arise; the fault is either in the Brain it self, or the Animal Spirits, or both together, and at first now these, now that.

(D.)1. As to the Animal Spirits, we have largely enough declared, of what sort they ought to be, of their proper and genuine nature, and what they are by reason of their preternatural [abnormal] disposition, in the *Phrensie, Melancholy,* and *Madness.* But besides (which we before mentioned) it may be suspected, that these Spirits being sometimes almost destitute of active Particles, become as it were liveless or vapid; to wit, when the spiritous Particles ought to excel, and to get to themselves volatile Salts; in *Stupidity,* both these, together with the Sulphureous, being too much depressed, they are almost drowned and overwhelmed with the watery and terrestrial. For indeed, Fools are not so dull or of such thick understanding, as their soul seems to be indued with, and their Animal Spirits are rather formed of clay than their Heart. There are many occasions or evident causes, by which the Animal Spirits acquire so deadish a texture, the chief of which we shall touch on by and by.

(E.)2. But it doth not frequently come to pass, that *Stupidity* is excited by the mere solitary fault of the Spirits, or of the Corporeal Soul it self, but more or rather the Brain it self is found to be first in fault:

For as there are many things requisite, by which this exact subject or machine of the Animal Function is constituted, if by chance any thing of them be deficient or depraved, it easily follows, that such so distemper'd have little wit.

(*1. As to Magnitude.*)

(F.) First, It is a vulgar observation, That the wit and ingenuity doth depend somewhat on the magnitude and figure of the Head, and consequently of its Brain; for as to its bulk, it is a Proverb, that it argues little of Brain or too much Foolishness [too little or too much Brain argues for Stupidity]. And although this does not always happen, yet it does for the most part. The reason of which is, because in a little Brain but a few Spirits are begotten and exercised; but in a greater, consisting for the most part of a vile or base texture or frame, it is less fitted for the quickness or sharpness of the mind.

(*2. By Reason of the Figure.*)

(G.) Secondly, The genuine and best figure of the Brain ought to be globous; to wit, for the end that the Spirits may be poured forth with an equal efflux on every side, from its middle part to the whole compass, and may be from thence retorted every where by equal angles of reflections. But those who have a flat head, or too sharp, or otherways improportionate, are effected for the most part with some noted fault of the Animal Function; for these kind of Brains, like distorted Looking-Glasses, do not rightly collect the Images of things, nor truly object them to the Rational Soul.

(*3. As to its Substance or Texture.*)

(H.) Thirdly, The substance of the Brain should be well temper'd, and of a laudable frame; not only as to the qualities of heat and cold, of driness and moisture, but its *Systasis* or Constitution consisting of plenty of a volatile Salt and Spirit, with a moderate proportion of the rest should be thin and airy, that the Spirits may pass thorow the whole, and cut out to themselves paths; also it should be moderately firm and compacted, that the tracts and passages being made, may remain, and not be presently blotted out again, by the sinking of the too soft parts. But in *Stupidity*, it is to be suspected, that there is in the Brain an excess of some manifest quality, as of moisture or coldness, for which reason, Children and old people are wont to be affected with a dulness of their senses; or sometimes, the Texture is too thick, and Earthy; so that the Spirits do not easily irradiate it, or cut tracts for themselves; to wit, they cannot penetrate an

opacous or thick body, no more than rays of light. To this kind of deadish Texture of the Brain, those that are born of Plowmen and Rusticks, as if they were formed of a worser clay, are obnoxious; hence in some Families, reckoning many descents backward, there is scarce one witty or wise man found. In some places, the influences of the Heaven and Air incline, as it is thought, the Inhabitants to Stupidity; so, to be born in *Batavia*,[10] is proverbially, as much as to say, a Fool.

(*4. The evil conformation of the Brain, as to its pores and passages.*)

(I.) Fourthly, Besides these vices of the Brain, which are for the most part original and born with it, sometimes its evil conformation, as to its Pores and Passages, by reason of some acquired inordinations, is a cause that the Animal Function is not rightly performed. For first of all, as to what appertains to the smaller Passages and Pores of the Brain (which the spirits themselves frame every where thorow its whole substance, and perpetual flow into them for the exercise of the Animal Functions) it sometimes happens that these are either defective or perverted, and so bring on a dulness of mind, or *Foolishness*. These little spaces are defective, because the consistency of the Brain being either too obdurate or too fluid, it will not indure to be cut thorow after a due manner, or to remain or continue so bored thorow. But we suspect those Passages to be perverted, either because they are too loose or too strait, or else, for that their making is unequal. Too strait Pores do not sufficiently admit store of matter for a good plenty of Spirits: Those loose above measure, receive together with that matter, *Heterogeneous* Particles, and infesting the Animal Regiment. They seem to be unequally formed, where they are more open in one part of the Brain, and more strait in another. For this cause we think it to be, that some understand, or know things well enough, but still judge evilly; for that their notions and conceptions, like the visible Images, passing thorow a diverse Medium, become distorted. Further, perhaps for this reason it comes to pass, that some excel, or are strong in Imagination and Phantasie, yet are very deficient in Memory, and others to the contrary.

[10] In the Latin text, this word is Boeotia; the translator has substituted Batavia. Batavians and Boeotians are proverbially stupid: I expect to attempt an exegesis of the proverbs elsewhere.

(*3. Stupidity sometimes proceeds from both of them being in fault together.*)

(J.) 3. It sometimes happens, that both these conjunct causes do concur together to Foolishness, to wit, because both the Animal Spirits are dull and torpid, and also the Brain evilly conformed. And in truth, which part soever is first in fault, it quickly will make the other in like manner guilty. Because when the Spirits being blunt and sluggish do not freely pass thorow the Brain, the Pores and Passages in it are not either sufficiently cut thorow, or else they close again; and the Spirits if they cannot expand themselves, by reason of the evil texture of the Brain as they should do, they at length becoming slothful and idle, grow heavy, and acquire a vicious disposition.

(K.) Thus much concerning the Conjunct Causes of *Foolishness,* as to its *Procatartick* and *Evident,* there belong more occasions, by reason of which the aforesaid evils are wont to be brought to the Brain, or the Spirits, or to both together.

(*What the Antecedent Causes of Foolishness, are, 1. An Hereditary Disposition.*)

(L.) For in the first place, *Stupidity* (as we but now observed) is sometimes original or born with one, and so it is either *hereditary,* as when Fools beget Fools, the reason of which is clear enough, to wit, the same weak Particles flowing for the constituting the Animal Organs in the Son, which were in the Father: or *Stupidity* being born with one, is as it were accidental, to wit, it frequently happens, that wise men and highly ingenious, do beget Fools and Changelings, or heavy witted: which we suppose so to come to

(*Why strong or wise men are not always begotten of strong and wise Men.*)

pass sometimes for this cause, for that the Parents being too much given to study, reading, and meditation, the Animal Spirits that inhabit the Brain, are so much wasted, that for the supply of them, the most generous Particles of the Blood are still carried to the Head, and but few only, and small, are permitted to descend to the *Spermatick* Bodies.

(*The first Reason.*)

When the rational Soul becomes greatly solicitous in bringing forth its child (which are the works of the Intellect) then the Corporeal Soul

(the Spirits being called away to wait on the other) becomes not at all, or very weakly prolifick.

(*A Second Reason.*)

(M.) Besides this reason, there is another frequently to be met with, wherefore the first implanted sagacity of men, as well as of *Brutes,* is not often propagated from the Parents to the Children. For when as we presume certainly, the Colt of a generous Horse, or of a delicate strain, or the Chickens of a Game-Cock, that they will *patrissare,* or be like their Sires, so that they are sold at a great rate, and the virtues of these, if not broken by inordinate and preternatural feeding or bringing up, descend by a long series to their young from age to age: This often happens otherwise to men, to wit, because the Parents do so enervate and weaken their bodies by intemperance, luxury, and evil manners, that they beget only languishing and unhealthy Children. Hence it is, that for the most part, those who are born of Parents broken with old age, or of such as are not yet ripe or too young, or of drunkards, soft, and effeminate men, want a great and liberal ingenuity or wit. Nor does there happen a less detriment to them of the Animal Faculty, whose fires are obnoxious to evil affectations of the Brain, as the *Palsie* [paralysis], *Epilepsie, Carus, Convulsions,* and the like; so that to be born of Parents who *have a sound mind in a sound body,* is far beyond a large patrimony.

(*2. Ripeness and the Declination of Age dispose some to Foolishness.*)

(N.) Secondly, There are more evident causes, by which *Stupidity* is wont to be induced, to some originally whole. Some at first crafty and ingenious, become by degrees dull, and at length foolish, by the mere declining of age, without any great errors in living; to wit, because the nervous liquor, and the blood, (whose evil dispositions the Animal Spirits partake of) like some Wines, and other fermented liquors, depart from their vigor after a perfect Fermentation; and by little and little degenerate into a dead and pallid substance. For it is observed, the wits of some people do receive a various increase and decrease, according to the periods of their Ages. I have known many in their childhood very sagacious, and extreamly docil or apt to learn, that by their literature and discourse have caused admiration, who afterwards becoming young men, were dull and heavy: and those who at first were very beautiful, were afterwards not at all handsome, or beautiful in their aspect. In like manner, it often happens on the contrary, that many at first indocil or unapt to learn, and wholly unfit for literature, and seeming of an ill favour'd countenance,

when they have become young men, or have put off their childhood, have had both an excellent wit, and become beautiful. The reason of the former is, that some ripe wit, or ingenuity, like garden fruit, does not remain long in the same condition, but soon declining, quickly withers. For in every mixture or concretion rightly made, there is required, that a progression from crudity to maturity be made gently and by little and little, that is, the active elements do not at first arise above the rest, and shew themselves above measure, but being involved with the others, rise up and put forth themselves by little and little; for otherwise, being too free in the beginning, and made loose, they easily fly away, leaving their subject almost dead or taste less. Wherefore, Boys who are seen to be dull in their first Age, may be hoped afterwards, when the temper of the Brain (the superfluous moisture being evaporated) is come to maturity, to become ingenious enough.

(*3. Great hurts of the Head sometimes cause Doting, or want of Ingenuity.*)

(O.) Thirdly, Sometimes great strokes or bruising of the Head, especially such as happen from a fall from some high place, do bring hurt or debility to the Animal faculties. I have known some very learned, and men of great wit and judgment, who outliving some of these falls by chance, afterwards were of a heavy and dull ingenuity. It is commonly said of such so distemper'd, that their Brain is turned; and indeed a vehement Convulsion or shaking of the Brain, greatly perverts, and not seldom presses together, or shuts up the accustomed tracts and paths of the Spirits, so that they perform the acts of the Memory and the Imagination for ever after, hardly, and amiss; so as some by some great wound inflicted on the Head, have become sottish, and afterwards mad.

(*4. Frequent Drunkenness.*)

(P.) Fourthly, Frequent Drunkenness and Surfeiting, especially if they sleep in their Cups, and lie as it were buried in Wine and Sleep, do very much decay the wits of some, and make infirm the use of their Reason; to wit, because by them, *Heterogeneous* little Bodies, and infesting very much the Animal Regiment, are introduced. Almost for the same reason, the frequent use of *Opiates* very much troubles the sharpness of the mind.

(*5. Vehement Affections.*)

(Q.) Fiftly, Violent and sudden passions, as in the first place, an

unexpected and very great affright, or terror or vehement sadness, have caused Sottishness or Foolishness in some, so that they have been scarce able to express the sense of their mind in words, or to perform the familiar actions of life. Which certainly comes to pass, forasmuch as the spirits inhabiting the Brain upon such an occasion, are very much dissipated and drawn asunder one from another, and afterwards, are not able to repeat the former footsteps of their motions; in like manner as Souldiers, being put to flight by a suddent and violent attack of the enemy, recover not easily their orders and stations.

(*6. The more grievous Diseases of the Head, oftentimes excite Foolishness.*)

(R.) Sixthly, It is observed, that some men have contracted also *Foolishness,* by reason of cruel Diseases of the Head. This frequently happens in a great and long *Epilepsie,* for that this Distemper, possessing the middle part of the Brain, perverts, and so fills and stuffs up with feculencies, all the Pores and passages, the Spirits being thereby frequently and vehemently thrust forth, that the tracts of the Spirits being shut up; the acts of the internal Senses and Motions are hindred. I knew a young maid, at first of an acute wit, and lively ingenuity, who after she had long laboured with the Falling-sickness, became sottish and Foolish, like a changeling. Further, I have taken notice in many, that *Stupidity* hath accompanied the *Palsie,* or has gone before it (as we mentioned in the Chapter of the *Palsie*) to wit, the same matter which brings a resolution or loosning, being in the Streaked Body, being heaped up in the *Callous,* causes often, if not an *Appoplexy,* or *Carus,* a *Foolishness.*

(*The Differences of this Disease.*)

(S.) Many differences of this Disease are to be met with; and first, there is commonly wont to be a distinction between *Stupidity* and *Foolishness,* for those affected with this latter, apprehend simple things well enough, dextrously and swiftly, and retain them firm in their memory, but by reason of a defect of judgment, they compose or divide their notions evilly, and very badly inferr one thing from another; moreover, by their folly, and acting sinistrously [awkwardly] and ridiculously, they move laughter in the by standers.

(*How foolishness and stupidity differ.*)

On the contrary, those who are *Stupid,* by reason of the defect of the Imagination and Memory, as well as of the Judgment, do neither appre-

hend well, or quickly, nor argue well; besides they behave themselves not as the others by toying and gesticulation, but sottishly, foolishly, or like a dull Ass; so that the *simplicity* of these is the more miserable, who shew so the Disease in their countenance and behavior. In *Foolishness*. it seems, that the Animal Spirits being somewhat active, though less firm, do pass thorow only more short and oblique tracts, and do not beam thorow the Brain, with an equal and constant irradiation, but leaping forth, or running out desultorily or after a leaping manner, sometimes here sometimes there perform the acts of the Animal Functions, perfunctorily only, or ridiculously. But in *Stupidity*, the Spirits being obtuse and dull of their own proper nature, and flowing, very little pervious in the more thick Brain, cannot exercise themselves rightly, for the performing the offices of the Animal Regiment.

(*Degrees of Stupidity.*)

(T.) Stupidity (whose *Pathology* we here chiefly deliver) hath many degrees; for some are accounted unfit or incapable, as to all things, and others as to some things only. Some being wholly fools in the learning of letters, or the liberal Sciences, are yet able enough for *Mechanical* Arts. Others of either of these incapable, yet easily comprehend *Agriculture*, or Husbandry and Country business. Others unfit almost for all affairs, are only able to learn what belongs to eating or the common means of living: Others merely *Dolts* or drivling Fools, scarce understand any thing at all, or do any thing knowingly.

(*The Prognostick of the Disease.*)

(U.) As to what belongs to the *Prognostick*, *Stupidity* being contracted from the birth or hereditary, or happening from unknown causes, if it still persists to ripe age, it is almost never healed: but when it happens that Children being at first dull and almost insensible, by reason of the complexions of both their Brain and Spirits being ripened, they are made ingenious and docil enough.

(*Evil if from an hurt of the Head.*)

(V.) This Disease excited from an evident solitary cause, as from an hurt of the Head, or a violent passion, also coming upon an inveterate *Epilepsie*, if it continues for some time, it is afterwards incurable.

(*What is excited from a Lethargy admits a Cure.*)

(W.) What succeeds a *Lethargy,* and any other sleepy Diseases, depends chiefly on the hurt of the Memory, and sometimes vanishes of its own accord, those Distempers being cured. Therefore, when in these cases the cure of *Stupidity* is instituted, here are convenient almost the same method of healing and Remedies, which we have prescribed in the Preservatory *Indication* of the *Lethargy;* the chief intentions of which are, that the Animal Spirits being freed from any torpor or benummedness, cut forth or frame Pores and passages within the translucid Brain, and may be expanded truly in them.

(*Sometimes it is cured by a Feavour.*)

(X.) Sometimes a *Feavour* has cured some Fools, and stupid, and render'd them more acute. *Huartus* tells of a certain man that was a Fool in the Court of *Corduba,* that being distemper'd with a malignant Feavour, came so much to himself in the midst of the Disease, and with that judgment and discretion, that the whole Court stood in admiration; and so remained his whole life afterwards, one of the most prudent men of his time. We our selves have known a certain man of a very blunt, *Boeotick* or dull wit, who talking idly in a Feavour, most suddenly brought forth most acute speeches, and seasoned with a great deal of salt or ingenious wit. Further, we before spoke of a generous old Gentleman, who having lost his memory, and so the use of discourse, received great help by the distemper of a Feavour happening afterwards; the reason of which seems to be, because the feavourish burning sometimes rarefies and dispels the darkness covering the Brain.

(*The Cure requires both a Master and a Physician.*)

(Y.) As to what respects the cure of this Disease, *Stupidity,* whether innate or acquired (if it be not plainly *Madness* or *Stolidity,* uncapable of all learning) though it may not be cured, yet is often wont to be amended. Wherefore it must be the work both of a *Physician* and a *Teacher,* that the wit of such that are so affected, may be somewhat trimmed, and they being at least brought to the use of reason in a little measure, may be accounted out of the number of *Brutes.*

(*What the labour of the former ought to be.*)

(Z.) For this end, because dull or senseless Beetles, or the more dull Loggerheads or Blockheads, do not readily learn the common notions of

things, no more than Children the first elements of letters, therefore they are to be instituted in all things, by the frequent care of a Master, and the same things are again and again to be inculcated to them. For by this means, the Spirits, though slow and torpid, are a little sharpened by perpetual exercise, and they being continually excited in the Brain, now rude and crasse soever they be, do cut forth at length for their expansion, some tracts or passages, though more imperfect. But that this may the more happily and easily succeed,

(*What the Medical intentions are.*)

medical Remedies ought to be administred, which may purifie and volatize the Blood and nervous Liquor, together with the Animal Spirits; and also, that may clarifie the Brain, and render it as it were *Diaphanous.*

(*What kind of Remedies are shewn. 1. Evacuating Remedies.*)

(A.A.) For the purifying the Blood, let there be sometimes administer'd a gentle Purge, and *Phlebotomy* in a small quantity, if there be strength, several times; for that end also Issues are convenient, in the Arm or Leg, or both, for the driving the filthiness from the Brain: In fat folks, and such as are indowed with a moist Head, let them sometimes be made between the shoulders. Further, some in this case cry up with wonderful praises a *Trepaning,* by which the Brain may more freely breath forth, and evaporate. Let their diet be light and attenuating; their dwelling in a free air, and dry; their sleep moderate.

(*2. Altering Medicines.*)

(B.B.) After these have for some time been administred, in the ordinary and usual manner, *if that in the left part of the breast there is no beating of the heart in the Arcadian youth,* or if there be no sign of hopes, it will be in vain to spend labour and pains, and Medicines any further on them: but if by the use of these, any signs of help, or any hopes appear, sometimes it will be to the purpose to add to these, altering Remedies, to be daily taken at medical hours, for a long time. The *Recipes* or *Formula's* of these are already delivered in our *Pharmaceutice* for the taking away the foregoing causes of most *Cephalick* Diseases; and thence may be taken: moreover, what do besides respect this particular case, we think here good to add, being some magisterial Receipts.

(*Spirits.*)

(C. C.) Take of the spirits of Armoniacum, succinated, or with Amber six drams; let it be given from fifteen to twenty drops Evening and Morning, in three spoonfuls of the following distilled water; drinking after it seven spoonfuls of the same.

(*A Distilled Water.*)

(D. D.) Take of the fresh leaves of Mistletoe of the Apple tree six handfuls; of the lesser Sage, Rosemary, Savory, the greater Rocket, Mother of Thyme, Calaminths, Penyroyal, Marjoram, each four handfuls; of the roots of Angelica, of Imperatoria, each six ounces; of Zedoary, the lesser Galingal, or the Aromatick Reed, of Winterans Bark, each two ounces; of Cloves, Nutmegs, Mace, Cinnamon, Ginger, each one ounce; of Cubebs, Cardamums, Grains of Paradise, each six drams; all of these being cut and bruised small together, pour to them twelve pints of the best Canary; let them be digested cold, and close shut in a vessel for three days, then distilled according to art: let the whole liquor be mixed together, and sweetned with Sugar when it is taken: The Dose is two or three ounces.

(*Tinctures, Elixirs.*)

(E. E.) After the use of the Spirits of Armoniack for fifteen or twenty days, other Medicines about that time may have their turns, such as Spirits of Hartshorn, of Sut, Humane Skull; Tinctures of Coral, Antimony, Castor, Amber; the Elixir Vitae Quercitani, Elixir Proprietatis, Spirits of Lavender, etc.

(*An Electuary.*)

(F. F.) Or take of the conserves of the flowers of the Lilie of the valley six ounces, of the roots of Acori veri preserved six drams, of Ginger preserved in India, of preserved Nutmeg, each half an ounce; of Species Diambrae two drams, of Lignum Aloes, yellow Saunders, the pickt roots of Zedoary, of Cubebs, of Jamaica Pepper, each one dram and a half; of Coral prepared two drams, of the Syrup of Candied Ginger what will suffice; make an Electuary. The dose two drams Morning and Evening, drinking after it of the distilled Water three ounces.

(*Coffee.*)

(G. G.) For those whose Brain is too abounding with moisture, let them drink every Morning a draught of Coffee, with Sage leaves boiled in it: For those who have their Animal Spirits too poor and liveless;

(*Chocalate.*)

Let them take Chocalate, as we have described it above which seems most profitable.

(*Physical Beer.*)

For ordinary drink let small Ale or Beer be prepared in a vessel containing three or four Gallons, and after it has work'd, put into it in a little bag, these following things. Take of the leaves of Sage, the sharp leaved and dryed, four

handfuls; of Cubebs one ounce, of Cloves and of Nutmegs bruised, etc. Mix them according to art.

(*Outward Applications.*)

(H. H.) Outward Applications have also a place here; such are a quilted Cap, Plasters, and Liniments: and sometimes let these, sometimes those or others be administer'd.

(*A Cap or quilted thing for the Head.*)

(I.I.) Take of the flowers of the Lily of the valley, Rosemary Flowers, Stoechadoes, each one handful; of Celtick Spike two drams, of the roots of Cypress, the lesser Galingal, the Florentine Iris, each three drams; of Labdanum, Benzoin, of Toluvian Balsam, of Amber, each two drams; of Nutmegs, Cloves, Mace, Cinamon, each one dram and a half: make of them all a fine powder, quilting it in a cap with silk between.

(*A Plaster.*)

(J. J.) Take of the Plaster of Floris unguent. so called, two ounces, of Tachamahac, of Carranae, of the Balsom of Tolu, each three drams; of the powder of Amber, Myrrh, each two drams; of Cloves, Nutmeg, Mace, each one dram; being all liquefied or melted together, let them be made into a mass, of which make a Plaster, spread it on leather, and the head being shaved, put it to it.

(*A Liniment.*)

(K. K.) Take of the Oyl of Palms half an ounce, of Capive Balsom three drams, of the Balsom of Peru one dram, of the Oyl of Nutmeg, by expression two drams, Oyl of Amber half a dram; make an ointment for the head.

(L.L.) I might here add many other Medicines, and ways of Administrations, but in this almost desperate case, where oftentimes no Remedies are wont to help, and the Cure never perfected, these may suffice.

Interpretation of the above text requires some knowledge of the views held by Willis on the anatomy and physiology of the nervous system.[11] The most pervasive and basic concept is that of "the soul of Brutes." Willis repeatedly states that he drew this concept from Gassendi. In Brett's summary of Gassendi's *Syntagma philosophicum*,[12] we find, concerning the soul of brutes,

[11] For an adverse (and unsound) evaluation of Willis's neurophysiology, see Michael Foster, *Lectures on the History of Physiology*, Cambridge: Cambridge University Press, 1901. For an evaluation of Willis's attempts at localization of function in the central nervous system, see Max Neuburger, *Die historische Entwicklung der experimentellen Gehirn- und Rückenmarksphysiologie vor Flourens*, Stuttgart: Enke, 1897. A fairly detailed discussion of Willis's anatomical and physiological theories is found in Jules Soury, *Le système nerveux central*, Paris: Carré and Naud, 1899.

[12] Brett, *loc. cit.*, pp. 106, 108, 109.

> . . . [Anima] is the specific difference which distinguishes the animal from the inanimate and from plants: for as little as we may know about it, the soul of the animal is assuredly something very distinct from that soul which we may concede to plants. . . .
>
> . . . Gassendi is satisfied that the anima is corporeal. . . .
>
> . . . [Gassendi] feels moreover the danger of dealing with the Anima in any way that might bring him into collision with ecclesiastical authority: he chooses therefore to express himself *de anima brutorum*, though it is not the anima but the animus which makes the crucial distinction and superiority of man.

These passages fairly reflect views also expressed by Willis. It is clear that Willis was concerned about possible conflict with ecclesiastical authority and, while he attributes most of the higher functions of man to the rational soul, he does not talk about the rational soul very much, whereas he discusses a remarkable range of psychological topics with only an occasional glance at their basis in the function of the soul of brutes. His discussion of learning in animals, in Chapter VI of the *Two Discourses*, is an excellent example of this. The soul of brutes, in the hands of Willis, really seems to be simply a handy name for the assemblage of anatomical and physiological mechanisms which underlie psychological processes.

The corporeal soul, or soul of brutes, has two functions, a vital function and an animal function. To each function there corresponds a particular part of the soul, namely the blood and nervous juice which are, respectively, "flamie" and "lucid." A third part of the corporeal soul, the genital part, is taken from both. The fact that the genital function is dependent upon the corporeal soul is used by Willis, in *L.*, to explain why intelligent parents may have mentally defective children.

The animal spirits serve as mediators of the nerve impulses (the word impulse is used by Pordage in this context). Here Willis follows Gassendi rather closely. Again according to Brett, Gassendi thought that

> . . . nerves must be regarded (after Galen) as a sort of diffused brain, and the brain as a kind of highly developed nerve: every membrane consists of a sheath covering an inner membrane: the inner part is a chain of soft particles with a hollow center. The mechanism is not sensitive in itself, for the sensation only arises when some shock to the nerve is transmitted to the brain: this transmission requires a state of tension, and is therefore only possible when the animal spirits inflate the nerve channels sufficiently.[18]

We may compare the above views of Gassendi with the following remarks of Willis:

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[18] Brett, *loc. cit.*, pp. 123-124.

. . . the animal spirits being procreated wholly in the Cortical or Barky substances of the Brain and Cerebel, do descend by and by into the middle or marrowy parts, and there are kept in great plenty, for the businesses of the Superior Soul; in the mean time, a sufficient stock of these, gently flowing from this highest Province into the oblong and Spinal Marrow, and thence into the Nerves and Nervous Shoots, actuates all these passages, and blows them up into a certain Tensity.[14]

On the other hand, Willis adds to Gassendi in an important respect: He has examined the anatomy of the brain more thoroughly. One wonders, incidentally, whether Willis became interested in the fiber tracts because of the theory he took from Gassendi. In any event, he remarks:

. . . those Spirits . . . not only within the narrow Channels of the Nerves, but also in the large meeting places or Emporiums of the Head, have peculiar paths, to wit, the medullary tracts, as it were intrinsick Nerves, most curiously stretch'd forth here and there. But indeed, because it is objected, that I have not described all, and perhaps not exactly enough; therefore, that those medullary Passages may be the better beheld, we have lately [I. e., since the publication of *The Anatomy of the Brain*] instituted another more accurate anatomy of the Brain; to wit, by gently scraping with the point of a Pen-knife its parts, we removed everywhere the softer and brownish substance, a-Kin to the Cortex of the Brain, the whiter and more hard being left; by which means, in several places of the Brain and the Oblong Marrow, many medullary Chords or Strings, as it were distinct Nerves, wonderfully communicating among themselves, and with other white or medullary Bodies, were brought into sight.[15]

In this approach to the anatomy of the tracts and in his interpretation of their significance, Willis anticipates the thought and methods of Bell and of Gall.

Willis is famed for his attempts at localization of function in the central nervous system. While he got almost nothing in the right place, Neuburger (*loc. cit.* footnote 11) maintains that Willis began a new epoch in the study of localization and that his approach provided the basis for subsequent, rational, experimental examination of the problem. Among the actual localizations given by Willis were the following: perception in the corpora striata; imagination in the corpus callosum; instincts in the mid-brain; vital centers in the cerebellum; and memory in the cerebral cortex (". . . the Cortex or shelly part of the Brain is the seat of the Memory and the porch of sleep.").

Willis's neurophysiology is most striking in the use it makes of the reflex theory. He is far more subtle in his handling of this idea than

[14] Willis, *Two Discourses*, p. 24.

[15] Willis, *loc. cit.*, p. 25.

Descartes was. The nerve impulses, which consist of disturbances in the animal spirits, travel along the nerves [16] and are reflected in various ways: entering as sensory impulses, they are reflected outward as motor impulses, or they are transmitted upward to the cortex where they produce the vestigial traces which are the basis of memory. Willis compares the course of the nerve impulse to that of a ray of light and, in his reflex theory, impulses are in ". . . manifold ways reflected and refracted, by the Brain and Nerves, as it were by Dioptrick glasses. . . ." [17] Sensory impulses ". . . pass first of all thorow the streaked Bodyes, as it were an objective glass." [18] The use of focusing lenses in fact provides a fairly reasonable analogy to the course of the nerve impulses in the central nervous system which do, indeed, converge and diverge in various ways. In using this analogy, Willis was no doubt influenced by his knowledge of the course of some of the fiber tracts.[19]

The upshot of all this is that Willis regarded psychological processes as dependent upon nerve impulses of a truly physical nature. These impulses produce their effects by travelling along anatomically determined and ascertainable paths.[20] Pathological changes may result, therefore, from a

[16] Various authors have suggested that Borelli is more "modern" than Willis because Borelli believed in a *succus nerveus* which moved within the nerves, whereas Willis believed in animal spirits which flowed on the outside of the nerves. In fact, Willis repeatedly speaks of the nerves as hollow tubes: In the *Two Discourses,* e. g., on p. 25, we find ". . . for that they are shut up within passages, as it were pipes . . ." and on p. 27 ". . . the Animal Spirits, ordained within certain and distinct paths, or as it were small little pipes. . . ." For that matter, Borelli himself remarks, in his discussion of the *succus nerveus* (*De motu animalium,* vol. 2., Propos. CLIV, p. 324 of the Rome edition of 1680-1681): "By a number of experiments and considerations, the moderns show that the work of nutrition is only done by a juice that is communicated to all parts through the nerves from the brain: These considerations may be looked up in the writings of Willis and others."

[17] Willis, *loc. cit.,* p. 22.

[18] Willis, *loc. cit.,* p. 24.

[19] Since I wrote the above, a remark by Prof. K. E. Rothschuh has called my attention to C. Canguilhem, *La formation du concept de réflexe aux XVII^e et XVIII^e siècles,* Paris: Presses universitaires de France, 1955. In this book one finds an exposition of Willis's contributions to the discovery of the reflex. Willis is given a very important place in the history of neurophysiology by Canguilhem. I am in full agreement with this, although I think that Willis did derive important ideas from Gassendi.

[20] Willis apparently did not believe, or did not wish fully to commit himself to the belief, that the fiber tracts are identical with nerves. He always speaks of them as "quasi" nerves. Moreover, he suggests that the course of the fiber tracts may at least in part be determined by the course taken by the animal spirits: the flow of the spirits may carve out the tracts. However, once the tracts are established, they assume the same properties as nerves and, in particular, if a tract is cut or blocked, the function subserved by it is permanently lost. It is, at the very least, clear that Willis believed that

defect in the quantity or quality of the animal spirits, or from a defect in the structure or texture of the brain. With these points in mind, we may turn again to Willis's chapter on mental deficiency.

In the first paragraph, Willis asserts that faults of the animal spirits and of the brain do contribute to mental defect. In *B.* it is stated that all things which the mind beholds are supplied from either the imagination or the memory. Now the imagination, in the sense in which Willis uses the word, is the faculty of forming images, and memory is simply the retention of such images. It is therefore pertinent to observe that, for both Gassendi and Willis, the major source of ideas is sense impression. Turning again to Brett, we find that Gassendi thought that:

> . . . The primary activity of the conscious being is Imagination or the reception of an image also called idea. The idea is defined as the object of the mind when it thinks. . . . All ideas come to us from the senses and we must endorse the saying: *nihil est in Intellectu quod non prius fuerit in sensu* (Canon iv.) These ideas are supplemented by those which the mind constructs by its own activities.[21]

This is, of course, of great interest because of the role that the philosophy of Condillac played in the problem of mental deficiency nearly one hundred and fifty years later. In Brett's opinion, Gassendi thought that "'all thought is sensuous' which is hardly half-way to Condillac." But it is interesting to find a view which is even half-way to Condillac so intimately associated with this early consideration of mental deficiency. Willis echoes this belief thus: ". . . from this manifold way of sension, proceeds the Knowledge of all things, according to that of the Philosopher, *All knowledge is made by the Sense*. . . ." and again: ". . . So the Sense brings in the Imagination; this the memory or the Appetite. . . ." [22]

In *D.* we find that the spirits may be lifeless and of a deadish texture so that they cannot perform their function. Many examples of this are given throughout the rest of the text. In spite of this possibility, most stupidity results not from a defect in the spirits or in the corporeal soul, but (*E.*) from a defect in the brain itself. The influence of the size of the brain is discussed in *F.*: a small brain does not produce enough

a determination of the course of the fiber tracts would reveal aspects of the function served by them.

[21] Brett, *loc. cit.*, p. 13. The idea expressed in the phrase "*nihil est in Intellectu quod non prius fuerit in sensu*" is an old one, but the phrase itself apparently originates with Gassendi. It is often incorrectly attributed to John Locke who, in turn, is incorrectly regarded as the only important forerunner of Condillac.

[22] Willis, *Two Discourses*, p. 57 and p. 24, respectively. The role of Condillac's sensualism in the work of Itard and Seguin is briefly discussed in J. M. G. Itard, *The Wild Boy of Aveyron*, Trans. by G. and M. Humphrey, New York: Century Co., 1932.

spirits and, therefore, the nerves are not dilated enough to perform their functions. An overly large brain, on the other hand, tends to have a bad texture which impedes the movement of the spirits. Thus Willis believed that stupidity caused by too small a brain differs fundamentally from stupidity caused by too large a brain. The shape of the brain should be spherical (*G.*): here the theory in which reflex transmission of the animal spirits is compared to reflection of light appears. Imperfectly shaped brains, like bad mirrors, form poor images.[23]

That the texture of the brain may be abnormal and thereby lead to stupidity (*H.*) is foreshadowed in the writings of antiquity; but, in particular, it is foreshadowed by Gassendi's theory of memory, a theory which is similar to that of Descartes. Memory depends upon the brain receiving "folds" and a memory arises when animal spirits, for any reason, retraverse the path already marked by these "folds," or *vestigia*, or, in a more recent terminology, memory traces. But these "folds" tend to become obliterated by excess humidity of the brain such as may occur in old age.[24] In this and the following paragraph Willis refers to his belief that the course of the fiber tracts is originally determined by the path taken through the brain by the animal spirits. A pathological condition may arise when an abnormality of the brain (in texture or structure) prevents such passages from being cut. It may also arise when an abnormality of the spirits makes it impossible for them to cut such passages. In *I.* Willis mentions the distinction between mental deficiency and schizophrenia which is made explicit in *S.* Little is added in *J.* except the statement that a defect in either the spirits or the conformation of the brain will, in time, lead to a defect in the other, originally normal, component.

Willis discusses the "antecedent causes" of stupidity in paragraphs *L.* through *R.* He makes a definite distinction between congenital and

[23] Willis referred to post-mortem examination of the brains of idiots at least twice in *The Anatomy of the Brain.* The following passages are taken from the translation of 1684. The legend to Figure 4 reads: "The effigies of an humane Brain of a certain Youth that was foolish from his birth, and of that sort which are commonly termed Changelings; the bulk of whose Brain, as it was thinner and lesser than is usual, its border could be farther lifted up and turned back, that all the more interior parts might be more deeply beheld together." In Chapter 26, we find: "When of late we had dissected the Carcass of a man that was a Fool from his birth, we could find no defect or fault in the Brain, unless it was that its substance or bulk was very small. But the chief note of difference which we observed between the parts of this man and of a man of judgment, was this, That the aforesaid infolding of the intercostal Nerve, which we call the Internuncius of the Brain and Heart, proper to man, was very small in this Fool, and beset with a weaker guard of Nerves."

[24] Brett, *loc. cit.*, p. 134.

acquired mental deficiency in *L.* He says that there is a clear-cut hereditary form of mental deficiency "as when Fools beget Fools." A similar statement is found in *H.* ". . . in some Families, reckoning many descents backward, there is scarce one witty or wise man found." But Willis is not particularly concerned with this type of heredity, which he apparently regards as obvious and hardly worth discussion. He is more concerned with the appearance of congenital mental deficiency in the children of normal parents—i. e., Changelings. He realized that this is common, and he drew up a remarkable list of causes. It is surprising to find that he gives particular attention to the possible pathogenic effects of "Parents being too much given to study, reading, and meditation." Such parental study is directed at bringing forward "children" of a particular type: the works of the intellect. Parents who devote themselves to producing works of the intellect divert so much animal spirit to the rational soul that they deprive the corporeal soul of its share. The corporeal soul therefore becomes only "weakly prolifick." Thus, Willis felt that this type of mental deficiency in the children of studious parents was the result of a deficiency of animal spirits in the corporeal soul of the child.

The causes of mental deficiency in the children of parents of normal intelligence[25] (which are discussed in *M.*) are quite different: they comprise a list of somatic insults to the bodies of the parents. The list is reminiscent of the lists of causes of "degeneration" which became popular in the mid-nineteenth century. Such causes are, of course, found rather often in the literature of all periods. Intemperance, luxury, drunkenness, and effeminacy all weaken the body of the parent and predispose the children to mental deficiency. But Willis also remarks that parents who are too young or too old may have mentally deficient children. This became a favorite idea in later periods, including the present. The presence in the parent of organic disorders of the central nervous system also makes it likely that the children will be mentally

[25] According to G. Genil-Perrin, *Histoire des origines et de l'évolution de l'idée de dégénérescence,* Paris: Leclerc, 1913, the problem of "degeneration" and of scholarly parents having imbecile children was first raised by "Alexandre Tassoni" in 1621. Dr. Walter Federn tells me that Genil-Perrin evidently refers to Alessandro Tassoni's *Ten Books of Diverse Questions.* The passage discussing this problem first appeared in 1612. It appeared again in 1620 in Tassoni's *Dieci Libri di pensieri diversi. Libro Quinto. Accidenti e proprieta diverse. Quesito primo. Onde vegna che di padri di molto senno nascano figliuoli balordi, e di padri balordi figliuoli di molto senno.* This chapter in Tassoni may be the first systematic treatment of the problem of mental deficiency in the children of normal parents. The problem was much mooted in the seventeenth century; I do not know, however, whether Willis was influenced by Tassoni.

defective. Such disorders include Palsie [paralysis], Epilepsie, Convulsions, and Carus. [Carus is a condition of deprivation of the senses which is less than apoplexy but greater than lethargy, according to Willis's classification of states characterized by impairment of consciousness.] It can be seen that all the old chestnuts are well presented in Willis; but no one can disagree with his conclusion that, "to be born of Parents who have a sound mind in a sound body is far beyond a large patrimony." If we add to the list those predisposing causes discussed earlier—such as anatomical (*F.*) and physiological (*D.*) abnormalities of the brain and the influence of "Heaven and Air" (*L.*)—we obtain a list of causes such as grace most nineteenth and some twentieth century textbooks on mental deficiency.

Willis's discussion of the causes of secondary mental deficiency (in "some originally whole") includes a number of afflictions which might, in fact, still quite properly be included in a textbook discussion. Willis does not clearly define secondary mental deficiency and some of his cases are mental deterioration of a sort which would not today be classified as mental deficiency. Foolishness which results from "the mere declining of age," as described here, is not senile dementia, since it appears in young men who showed great promise as boys, but who became dull and heavy in later life. On the other hand, boys who seem dull may mature into men of considerable intelligence. Either change, toward intelligence or toward dullness, reflects the facts that the progression "from crudity to maturity" is a complicated one in which a great deal happens, and much can go right or wrong. The observation that apparently dull children may mature into young persons of normal intelligence may be compared with its counterpart in *U.* where it is stated that the prognosis is very bad if congenital stupidity persists to a ripe age. The idea of mental growth, and the comparison of the growth of the mind with ripening, is often used by Willis.

Great hurts of the head, drunkenness, and the frequent use of opiates, all cause stupidity, according to Willis: such stupidity would not be classified today as mental deficiency, nor would that which may result from "very great affright, or terror or vehement sadness." But mental deficiency secondary to epilepsy is occasionally classified with mental deficiency of other kinds even today, and Willis is more astute and precise than many of his successors in stating that it is only a "great and long" epilepsy which can result in mental deficiency.

The final cause of acquired mental deficiency is the palsie: in *R.* Willis says that stupidity may precede or accompany the palsie, and he

points out that he has discussed this in the chapter on the palsie. The description in the chapter on the palsie is generally regarded as the earliest reference to general paralysis of the insane:

> I have observed in many, that when, the Brain being first indisposed, they have been distemper'd with a dullness of mind, and forgetfulness, and afterward with a stupidity and foolishness, after that have fallen into a palsie, which I often did predict.[26]

The capacity of Willis for "close, careful, clinical observation"[27] is strikingly demonstrated in *S.* where he divides the mentally deficient into two types. These two types Willis calls the stupid and the foolish.[28] Both, we may note, are what we would now call socially subnormal, since both are included in his chapter on stupidity. The foolish have the following characteristics: 1) They are socially subnormal; 2) they apprehend simple things well, dextrously and swiftly; 3) they have good memories; 4) they have defective judgment; 5) because of this defective judgment, they reason badly and make bad inferences; and 6) they show folly, they act awkwardly, they toy and gesticulate, and this makes people laugh at them. Those who are stupid, on the other hand, are: 1) defective in apprehension; 2) defective in memory; 3) defective in judgment; and 4) they behave in a dull fashion and show simplicity in their countenance and behavior. Willis further remarks (in *T.*) that he is chiefly concerned with stupidity. The discrimination between stupidity and foolishness which is given above is very remarkable, and one may very easily take the description of foolishness as a description of schizophrenia. If one translates the description into modern terms, this becomes obvious: The foolish have contact with their environment (they apprehend); they remember; but they have a loosening of associations; finally, they show bizarre motor behavior. In my opinion, this passage may be regarded as a fairly good and very early description of simple schizophrenia. Even though Willis made this distinction, he still included these patients among those discussed under the general title "stupidity or foolishness." Willis's list of the characteristics of the "foolish" may be compared with Bleuler's list of the characteristics of the schizophrenic.[29] Thus, where Willis writes,

[26] Willis, *Two Discourses*, p. 163.

[27] F. H. Garrison, *An Introduction to the History of Medicine*, 4th ed., Saunders: Philadelphia, 1929.

[28] In the original text: *stupiditas* and *stultitia*, respectively.

[29] These passages from Bleuler are taken from the translations given by David Rapaport in *Organization and Pathology of Thought*, New York: Columbia University Press, 1951, pp. 636, 626, and 583, respectively. Rapaport points out that advances in our

" they apprehend things well enough, dextrously and swiftly," Bleuler says: " Lucid schizophrenic conditions show no disorder of consciousness, if the latter is conceived as implying a loss of sensory contact with the environment." Willis continues, ". . . and retain them firm in memory," and Bleuler says: ". . . memory as such does not suffer in this disorder." Finally, and most important by far, Willis observes: " They compose or divide their notions evilly, and very badly infer one thing from another. . . ." while Bleuler notes that ". . . the associations lose their connections." This final observation is most striking. Even today, a psychiatrist with no case history of the patient available to him may be able to differentiate mental deficiency from schizophrenia only if the presence or absence of the schizophrenic thought disorder can be established. It is because Willis describes the thought disorder and includes it in his criteria for distinguishing foolishness from stupidity that I do not hesitate to identify Willis's description as a description of schizophrenia. It is probably the first such description which can be positively identified in the psychiatric literature.

Further clinical observation and description is found in *T.* where Willis offers a classification of stupidity by degrees of severity: 1) Those who are incapable of learning letters or liberal sciences, but who are capable of learning the mechanical arts; 2) those who cannot learn letters or the mechanical arts, but who can comprehend agricultural pursuits; 3) those who can master only feeding themselves and " the common means of living "; and 4) those who scarcely understand anything or do anything knowingly (and who, by implication, cannot even learn to feed themselves or to handle " the common means of living "). This practical and functional classification is an excellent one by modern standards. I would like to emphasize one point: Willis clearly recognizes that one degree of stupidity is defined chiefly by an inability to handle " letters "—i. e., to read and write. The statement which is sometimes made that the moron was " created " by universal education cannot be true since literacy was always expected in the higher social classes. It is nevertheless significant to find the high grade defective defined so explicitly in 1672.

On the matter of prognosis (*U.*, *V.*, *W.*), Willis states flatly that if mental deficiency persists from birth through to maturity without showing improvement, it never will show improvement. On the other hand, some children who seem dull greatly improve as they grow older. If the

knowledge of schizophrenia render some of Bleuler's statements inadequate. That Willis's clinical description may easily be brought into accord with that of Bleuler is sufficient for the point I wish to make.

condition is secondary to a blow on the head or to epilepsy and has persisted for some time, it will continue. If stupidity is secondary to lethargy or "sleepy sickness" (presumably encephalitis), it may improve with the passage of time. In these stupidity is chiefly a result of damage to the memory. Willis's case of a patient who was cured of his stupidity by a "feavour" was often quoted in the eighteenth and nineteenth centuries. The case is obviously not one of congenital mental deficiency and illustrates the fact that Willis did not limit the term stupidity to congenital mental deficiency.

In the discussion of treatment (*Y.* and *Z.*), Willis suggests that treatment should be reserved for those who have some chance of improvement. Treatment is excluded for madness and stolidity, where, presumably, by stolidity is meant one of the severe grades of deficiency described above. The treatment consists of supportive medical care, plus the efforts of a teacher. The disease cannot be cured, but improvement can be obtained by teaching in which painstaking repetition plays a great role. But before any extensive treatment is undertaken, a trial period is recommended (*B.B.*); this period should last for some time, but if no improvement results, "it will be vain to spend labour and pains." This appears to apply to the medical treatment and, in particular, to the use of drugs; but, presumably, it applies also to the work of the teacher, since the teacher and physician are to work together. Perhaps the best comment on the medical side of the proposed treatment is that made by Willis himself in the preface to *De anima brutorum*, where he remarked that, in therapy, he departed less from the ancients than in other matters. The mere proposal, however, that mental deficiency is susceptible to improvement by special education which is to be the joint responsibility of the physician and the teacher, is a great departure from the ancients.

In evaluating this chapter of Willis's, both by itself and in relation to the book in which it appears, one is struck by the sharp clinical observation and by the sound prognostic and therapeutic judgment. Only a great and long epilepsy causes mental deficiency; stupidity and foolishness differ by the presence of thought disorder in foolishness; mental deficiency can be classified in terms of social adaptability; mental deficiency which persists from infancy through maturity is incurable; mental deficiency should be treated by the joint efforts of a physician and a teacher; an ambitious progam of treatment should be embarked upon only if a trial program shows positive results. These observations make this short chapter a treasury of clinical astuteness.

The neurophysiology and the psychology which are discussed in the earlier sections of the book are equally remarkable. Willis has yet to receive his rightful place as a physiologist: many fragmentary and often misleading studies of his work have done his reputation no service. It may seem that Willis does not fully succeed in relating his neurophysiology and his psychology to his clinical observations. But the cause of mental deficiency is still unknown, and Willis's concepts are quite subtle and provide a useful framework for his clinical observations. To demand more would also be to demand more than any modern author on the problem can supply. Willis at least had the wisdom to preface his book with a suitable quotation: ". . . Truly 'tis no unjust Complaint of the Soul, that she understands all things but her Self."

HUMORAL THERAPY IN SHAKESPEARE'S PLAYS

JOHN W. DRAPER

Shakespeare regularly added credibility and motive to the stories that he used by giving the characters a convincing psychology and sometimes also astrological background, based on the popular science of the age. Thus he interpreted men's actions as the result of the predominance of one of the four humors of Galenic medicine: blood, which made one "sanguine" and sometimes over-sexed or gullible, but generally lucky; phlegm, which was cold and wet and made one "phlegmatic" and perhaps indolent and stupid, but was fairly lucky; yellow bile (choler), which was hot and dry and made one perverse, passionate, truculent, and even given to fury, and so was unlucky; and black bile (melancholy), which made one mildly or even insanely manic-depressive and went with misfortune and old age. The mercurial complexion in astrology was easily subject to passing influence and consequently unstable. The happiest state was a perfect balance of the humors; this gave serenity and judgment but was rarely found in life and hardly dramatic. The stars ascendant at one's birth, or one's sex or age, or passing circumstances or events, determined one's humor; and, if this humor accorded with the immediate need and with one's social class, the outcome was comedy; and, if not, the catastrophe of tragedy. The choleric and the melancholic humors and the mercurial complexion, therefore, must generally be cured, or at least assuaged, if one would achieve success and happiness.

Some years ago, in a monograph on Shakespeare's use of Renaissance psycho-medicine, I included a chapter on characters who during the course of a play show a consistent change in humor.[1] This change naturally arises from a change in the conditions that dominate the character's life. Sometimes it is unintentional, the result of events in the plot, like Shylock's evolution from the melancholy proper to a Jew and a usurer to the choler caused by his daughter's elopement,[2] or like Timon's two changes from his naturally sanguine nature to choler as his loss of fortune makes his fair-weather friends desert him, and to melancholy and suicide as this choler burns out his vital powers,[3] or like Lear's shift from the choler of his

[1] J. W. Draper, *The Humors and Shakespeare's Characters*, Durham, N. C.: Duke Univ. Press, 1945, chap. viii.

[2] J. W. Draper, "The psychology of Shylock," *Bull. Hist. Med.*, 1940, *8*: 643-650.

[3] J. W. Draper, "The psychology of Shakespeare's Timon," *Mod. Language Rev.*, 1940, *35*: 521-525.

maturity and royal station to melancholy and madness as a consequence of old age and ill-treatment by his elder daughters.[4] Sometimes, however, this change results from more or less deliberate therapy, usually on the part of a friend who wishes to cure his malady or has some interest in changing it.

Shakespeare, although he follows the popular science and medical books of the day, seems, like Molière, to have had a poor opinion of doctors. The French Dr. Caius in *Merry Wives* is rather a figure of fun, perhaps because he is a Frenchman, and hardly appears professionally. *All's Well*, to be sure, refers to a famed physician who has instructed Helena so that she can cure the King; but her teacher is dead before the play begins. Cleopatra likewise has a physician who does not appear. In *Cymbeline*, Cornelius verges on malpractice by passing off sedatives as poisons to his mistress. The English doctor in *Macbeth* vouches for the "sanctity" of Edward the Confessor's healing of the king's evil, a proof of Edward's divine right to the throne.[5] Lady Macbeth's Doctor seems to be concerned with politics in a more personal way. Though she suffers from a recognized disease,[6] he dismisses her as "beyond my practice," says that she is not sick but "troubled with thick-coming fancies," and declares that such a one "must minister to himself." Macbeth in disgust replies, "Throw physic to the dogs, I'll none of it." Perhaps the Queen's misdeeds had made her illness progress beyond all hope of medicine; but, at the end of the scene, the Doctor's aside shows him more interested in saving his own neck in the current civil war than in saving his patient. Dr. Butts also, physician to Henry VIII, appears merely in a political guise. Doubtless, court physicians in that age were more politicians than practitioners of medicine. Apparently, the only satisfactory doctor in Shakespeare is the one who cures King Lear by the accepted therapy of rest and music; but the cure is only temporary, perhaps on account of the bad turn of political events. In matters medical, Shakespeare generally shows laymen as better than professionals; and their amateur efforts appear in some comedies and in several of the tragedies.

Perhaps the fullest treatment of this theme is the case-history of Kate's choler in *The Taming of the Shrew*.[7] In the Induction, the servants

[4] J. W. Draper, "The old age of King Lear," *J. English and Germanic Philology*, 1940, *39*: 527-550.

[5] Shakespeare added this scene to Holinshed as a glance at James I's similar ritual as proof of his divine right. See J. W. Draper, "*Macbeth* as a compliment to James I," *Englische Studien*, 1938, *72*: 207.

[6] J. W. Draper, "Lady Macbeth," *Psychoanalyt. Rev.*, 1941, *28*: 479-486.

[7] J. W. Draper, "'Kate the Curst,'" *J. Nerv. & Ment. Dis.*, 1939, *89*: 757-764.

persuade Sly that he has been suffering from melancholy lunacy; and he attends Shakespeare's comedy to relieve this melancholy by the accepted therapy of amusement and diversion. In the comedy itself, Kate is actually sick with choler, though the cause of it is imputed to jealousy rather than (as it should have been in current science) to the stars under which she was born; and her husband Petruchio, who takes on himself the rôle of a physician, pretends also to have her disease in order to effect a cure Both heredity and upbringing should have made Kate a proper Renaissance young lady; but jealousy of her sister, who has suitors when she has none, and the violence that arises from this jealousy, which scares off suitors even more, and makes them taunt her as " curst " and a condemned spinster, and that turns even her father against her—all this has given her a serious case of choler. Shakespeare does not use astrology and her horoscope at birth to explain her malady; but the very human causes that he does present would have been acceptable to Elizabethan medicine. Petruchio's therapy is partly psychological and partly physical: during the courtship, he ignores her taunts and violence; but, during and after the wedding, he actually outdoes her in unseemly outrage: he quaffs the ceremonial muscadel to prepare him for his choleric role and at once drags her off from the nuptial festivities, taking her through cold and wet to his country house, which is also cold, and thus subjects her hot, dry humor to the opposite extremes; he will not let her eat, especially burnt meat and mustard, which were thought to augment choler; and he spends the marriage night giving a lecture on continence, for choleric persons were considered over-sexed. Her cure appears in her docility on the journey back to visit her father and by her winning the wager of obedience as compared to the other wives. The main plot of the comedy portrays a full case-history, with causes, symptoms, and successful therapy. This therapy is not as convincing to us as it was to Elizabethans, for science changes, and the play has therefore become a mere farce. About the same time Shakespeare was using the companion science of astrology to give verisimilitude to *Romeo and Juliet*.[9] In later plays, astrology appears only in passing reference; but humoral therapy, though it never again is as predominant as in *The Shrew,* is often an important element in characterization.

[8] Falstaff likewise uses wine to augment choler. See Ruth E. Sims, " The green old age of Falstaff," *Bull. Hist. Med.*, 1943, *13*: 144-157.

[9] J. W. Draper, " Shakespeare's ' Star-Crossed Lovers.' " *Rev. English Stud.*, 1939, *15*: 16-34.

Much Ado [10] also presents a cure for choler, though rather less medical; and it likewise has two contrasting heroines, the submissive Hero, whom Claudio conventionally woos, after proper inquiry about her financial prospects, and the sharp-tongued Beatrice, the prototype of the independent Elizabethan woman. She has set her cap for Benedick, whose recent military exploits have made him quite as choleric as she and consequently impervious to love. Beatrice's railing will not let him ignore her but does not seem to arouse the right emotions. Finally, the other gentles in the comedy unite in a pious plot to break the stalemate and bring the two together. They let Benedick overhear them declare that Beatrice beneath her sharp sallies actually languishes for his love, and he is much to blame for slighting her. They treat Beatrice likewise. Thus each is shamed into allaying his choler at least enough to make a match; and this constitutes the crux of that plot in the play. Their treatment is more common-sense psychology than it is medicine, but it achieves the result. It is all on a subtler plane than is *The Shrew,* where Kate uses physical violence and Petruchio mainly physical therapy; and this subtler psychological plane accords with the higher type of comedy.

Very different, and at least partly unintentional, is the court jester's cure in *Twelfth Night* of the Countess Olivia's melancholy. In the antecedent action, the death of her father and then of her brother has made her take a vow to mourn for seven years. In time, this vow becomes somewhat disingenuous; for she uses her mourning to frustrate the attentions of the local Duke Orsino, whose possessive ideas on marriage do not jibe with the lady's urge for independence. Her mourning frustrates also even less attractive suitors, her own aspiring steward Malvolio and the simpleton Sir Andrew, whose claim is pressed by her uncle Sir Toby. Yet, like Penelope in the *Odyssey,* she knows that she cannot put off forever the fatal decision. The jester Feste naturally takes for granted that his mistress will sooner or later accept the Duke and so risks punishment by deserting her household, where his wit is out of tune, and going to curry favor at the ducal court.[11] On his return, the Countess is at first angry; but her melancholy is wearing thin with boredom; and Feste's keen wit saves him by precipitating a rapid cure. He unwittingly prepares the lady to fall in love with the Duke's attractive messenger and so starts off the main course of the action. He uses the

[10] J. W. Draper, "Benedick and Beatrice," *J. English and Germanic Philology,* 1942, *41*: 140-149.

[11] J. W. Draper, *The Twelfth Night of Shakespeare's Audience,* Stanford: Stanford Univ. Press, 1950, chap. x.

accepted therapy of merry diversion and effects a cure, but not to the effect that he intended. In *Much Ado,* the treatment of choler is deliberately contrived and achieves its expected end; in *Twelfth Night,* it also succeeds but quite miscarries in its influence on the plot. Feste intends to save himself and perhaps to prepare the way for the Duke but opens the way to another lover instead. Neither of these comedies is, like *The Shrew,* a medical case history—indeed, *Much Ado* is hardly medical at all—but in both, the cure occupies an essential place in the action.

In *All's Well,* Helena is determined to marry Bertram, as Beatrice was Benedick in *Much Ado;* but she uses force rather than wit, with even worse immediate consequences. The King is ill. and she goes to court and cures him and asks as a requital that he command Bertram to marry her. The unwilling bridegroom perforce goes through the ceremony and then at once takes off to parts unknown and so puts off the consummation *sine die*—even worse than Petruchio's behavior on the bridal night. Helena's post-marital wooing is the main action of the plot. Her cure of the King is the first, but least effective, of her Shavian efforts to snare her marked-down lover; but the incident is dismissed summarily, and her method of therapy is not explained and is not quite convincing.

In the *Winter's Tale,* a romance written late in Shakespeare's career, Camillo refers to the sudden jealousy of King Leontes toward his virtuous wife as a "diseased opinion" and a "sickness" in agreement with current medical opinion;[12] but neither Camillo nor the others find an adequate cause or attempt a cure. In Act II, the abused wife blames "some ill planet"; and Antigonus later thinks that the King has been deceived by an Iago, "some putter on"; and Paulina tries to be a "physician" to Leontes; but her accusations do not curb his "tyrannous passion." His sudden cure at his son's death is hardly more convincing than his catching the disease: this is no case-history but very romance indeed.

The later tragedies, like the *Winter's Tale,* show a decreasing use of humoral therapy, but not for the same reason. Just as the Induction to *The Shrew* shows Sly being supposedly cured of a melancholy that he doesn't have, so in *Hamlet,* most of the other characters are trying to cure the Prince of a melancholy madness that he assumes to save himself from answering politically awkward questions; and King Claudius, who would like to have answers to these questions, is trying to find out, under the guise of curing him, how real this madness is, and whether perchance

[12] J. W. Draper, *The "Othello" of Shakespeare's Audience,* Paris: Didier, 1952, pp. 187-188.

the Prince has somehow learned the truth about his father's death. Claudius is a finished diplomatist [13] and so is very circumspect, for he is only joint ruler with the Queen who "lives by [Hamlet's] looks"; he wisely starts with a policy of public conciliation and so before the assembled court appoints Hamlet as Crown Prince. But Hamlet is not appeased, and Claudius must learn why. Under the excuse of curative diversion, Rosencrantz and Guildenstern are at once brought back from the University, two noble youths who were "of so young days brought up with him," life-long cronies to whom the youth will surely tell his inmost thoughts; and for the good of the Prince they are to pass on what they know to Claudius.[14] But Hamlet soon becomes suspicious, and the device fails. Then the King listens behind the arras while the Prince and his beloved Ophelia talk, but still Hamlet tells nothing. Polonius sounds him out, but to no avail. At last in the Play Scene, Prince and King exchange secrets: Hamlet is convinced that he may take the Ghost's word "for a thousand pound"; and Claudius learns that Hamlet knows about the regicide, learns that his malady is doubtless assumed, and so stops trying to cure it or to conciliate an implacable enemy. Only Polonius and Gertrude continue these efforts; but, in the Closet Scene, the one is killed, and the other is overwhelmed by learning that her present husband murdered her first; and Hamlet convinces her that he is mad only "in craft." Thus the theme of therapy has served its purpose as one of the phases of the diplomatic duel between the Prince and the King. The King's effort at cure through diversion with Hamlet's friends follows good medical tradition, and it serves to bring him and Gertrude to the crisis in the Play Scene and so has a major value in the tragedy. The theme of therapy appears only in the first half of the play, but it is deeply interwoven in the plot.

It appears also in *Timon of Athens,* but in the second half. The somewhat bungling efforts of his steward and of Alcibiades to cure Timon and restore him to normal life amount to very little and are doomed from the start. In *Othello,* the Moor falls into a frenzy of jealousy, but no one seriously tries to cure him—certainly not Desdemona who presses Cassio's suit and can hardly realize, even when Emilia tells her, that he is jealous, and least of all Iago! Macbeth, apparently born with a weak, mercurial nature,[15] is supported, though not cured, by his Lady who

[13] J. W. Draper, "Claudius as a diplomatist," about to appear.

[14] J. W. Draper, *The "Hamlet" of Shakespeare's Audience,* Durham, N. C.: Duke Univ. Press, 1938, chap. ii.

[15] J. W. Draper, "Macbeth 'infirme of purpose.'" *Bull. Hist. Med.,* 1941, *10*: 16-26.

herself collapses from assuming a choler unnatural to her; and, at her madness and death, the royal thane quickly disintegrates, even before going down to defeat and physical death. In *Antony and Cleopatra,* the noble Roman is torn between passion and political ambition,[16] a sort of schizophrenia that amounts almost to a disease; but no one attempts a cure, least of all Cleopatra, who is using both aspects of his character to secure her Egyptian throne. These plays, as tragedies, could hardly show successful therapy without nullifying the essential catastrophe; and in the last three, Shakespeare chose to show no attempt at therapy.

In *Lear,* however, therapy does appear, but too late to change the outcome. It supplies only that moment of false hope that in Elizabethan drama often separates the crisis in Act III from the general downfall in Act V. Cordelia, whose obstinate truthfulness at the start had largely initiated the unhappy chain of events, returning to England with an army from France, finds her crazed father; and her physician by the recognized therapy of rest and music restores him for a moment to sanity.[17] Her army, however, is defeated, and both are taken prisoner. His last flicker of strength gives way, and nothing remains for him but death. The royal choler of his better years has now, at the age of eighty and beyond, changed to a senile melancholy, and then through physical and mental stress, to madness. No more than a brief alleviation is possible, for his case has become as incurable as that of Lady Macbeth.

The violence, and even ferocity of the choleric type made them intensely dramatic; and Shakespeare's plays are full of their several sub-types and variations. Indeed, *Othello* gives us a full gallery;[18] but probably the fullest depiction of unrelieved choler is the Roman Coriolanus, and the early Romans were indeed a turbulent and warlike lot. The Tribunes, who hate him for his aristocratic arrogance, tent his humor to the quick to destroy his popularity as a successful general; and, in the early part of the tragedy Menenius reasons with him to mitigate his choleric pride and stoop to electioneering among the plebs whom he despises. His personal prowess against the Volscians in saving Rome generates greater choler, which in turn brings a greater reaction against him in Rome; and so, angered at the slights of his countrymen, he at last goes over to their enemies and prepares to lead the Volscians against the city of his

[16] J. W. Draper, "Subjective conflict in Shakespearean tragedy," *Neuphilologische Mitt.,* 1960, *61*: 214-221.

[17] J. W. Draper, "The old age of King Lear," *cit. sup.* Cf. Dr. Benedict in Dekker's *Honest Whore, Part I,* who cures Infelice by a sedative and music.

[18] J. W. Draper, *Humors, cit. sup.,* p. 59.

birth. The one hope of Rome is to win Coriolanus back, and this requires a mitigation of his choleric pride. Cominius and then Menenius go to Coriolanus, but their persuasions are in vain. Finally, his mother, who had given him his proud up-bringing, goes against her own instruction; and her entreaties finally win the day. He deserts the Volscians, and they kill him. Thus the cure, or at least the lessening, of his choler is the immediate cause of the catastrophe, though the ultimate cause was the original choler itself. Although the hero's towering pride is called "choler" and seems to be thought of as a disease, yet its mitigation is based, not on medical therapy, but on the mother's eloquence and power.[18] Kate's cure can be documented from a dozen books of popular medicine, but that of Coriolanus is human, all too human, and can be documented only by its truth to life. This change in Shakespeare is a bit surprising when one remembers that the early seventeenth century, the generation of Bacon and Harvey, was passing into an age of impersonal science; but not so Shakespeare.

Early in his career, Shakespeare seems to have taken science seriously, at least provisionally, and so based the main action of one tragedy on astrology and of one comedy on humoral psycho-medicine. The former science he never again used as a major motive. The humors, however, continued to furnish characterization and motive; and, perhaps because of this, he gave up humoral therapy more slowly: it lingers somewhat even into his third period. Olivia's cure in *Twelfth Night* (1600) seems to be the last really medical example, except for Lear, and in a sense Hamlet, for Shakespeare seems to have been replacing popular science with his own keen observation; and, in the tragedies, disease often runs its course (as it did so much in Elizabethan life) with little attempt at cure by doctors or even friends; and sometimes, as in Timon and Lady Macbeth, the cure is tried too late. The therapy theme, however, expressed medically or not, is variously used chiefly in the earlier plays: in *Twelfth Night* and *All's Well*, it furnishes an essential opening episode; in *Much Ado*, the central crisis; in *Lear*, the relief before the catastrophe; in *Timon* and in *Coriolanus*, the castastrophe itself. In the Induction to *The Shrew*, Sly's disease is spurious; and so it is not necessary for us to be told that the diversion of the comedy cures him, and Shakespeare does not bring him back at the end as did his source. In *Hamlet*, the Prince soon tells us that his "antic disposition" will be assumed; and the efforts at cure, sincere on Gertrude's part, and on the King's stained with ulterior

[18] J. W. Draper, "Shakespeare's Coriolanus," *W. Va. Philological Stud.*, 1939, *3*: 22-36.

motives, stop when each realizes that the disease, so far as it exists at all, is not the real cause of Hamlet's strange behavior. In *Macbeth,* the Queen seems to know that she cannot cure her regicide-husband, and so instead she assumes the choler, unnatural to her sex, that he should have; and as long as she can play this part, supports him in his royal role; but finally she breaks down and dies and leaves him to his fate: this is not a case of therapy and cure but of the King's arrested disease that does not stay arrested.

So Shakespeare, having explored in *The Shrew* the theme of humoral therapy, turned it to various uses in later plays, and then by degrees abandoned it, as he substituted for the theories of science his own observation. Perhaps science is more of a hindrance than a help to art. The nineteenth century that stresses heredity and environment and evolution, and the Freudian plays and novels of our day, are merely the recent equivalents of *The Shrew* and *Romeo,* artistic expressions, not of life, but of events interpreted *a priori* in terms of scientific theory. But scientific theory can easily change and even suffer complete discard; then the point of the play or the novel is lost, as the themes of *The Shrew* and of *Romeo and Juliet* are lost on a modern audience. Shakespeare in time outgrew the solution to the problem of interpreting events on the basis of shifting science and abandoned humoral therapy, as he had long before abandoned astrology.

FREUD AND THE PHILOSOPHERS *

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The relation of Freudian metapsychology to the history of philosophy and medicine is not easily determined. Castiglioni regarded Freud and the advent of psychoanalysis as the beginning of a tendency in psychiatry to demolish the barrier that existed between neurology and psychiatry—the two "hostile sisters" of Erb—and he made little effort to relate Freud's work to the history of ideas.[1] Many who have attempted this have concluded that Freud was a blatant empiricist or a complete skeptic, refusing to grant reason its proper role. Jungians believe that Freud's writings reflect an ignorance of philosophy and intellectual history. Others feel that in the final analysis the basis of psychoanalysis is an Aristotelian metaphysic.[2] And now existentialists are asserting that there are many ontological elements in Freud's metapsychology.[3] Such claims, however, are made with little consideration of Freud's education and *Weltanschauung*, with little attention to what Freud said about philosophy.

I

Fritz Wittels, Freud's first and "unsolicited biographer," [4] regarded him as an anti-philosopher, a scientist who realized that psychic phenomena, previously associated wtih brain processes, were independent of anatomy. In his *Autobiography* Freud inferred that he knew nothing of philosophy, that he had an "incapacity" for philosophical pursuits; and that, furthermore, he cared little for the problems of philosophy.[5,6] Instead

* Abstracted from a thesis approved for the degree of A. B. by Yale University.

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[1] A. Castiglioni: *A History of Medicine*, New York: Knopf, 1941, p. 887.

[2] R. Dalbiez: *The Psychoanalytic Method and the Doctrine of Freud*, London: Longmans, Green and Co., 1941, vols. I & II.

[3] H. M. Tiebout: "Tillich, existentialism, and psychoanalysis," *J. Philosophy*, 1959, *56*: 605-612.

[4] A. A. Brill (Trans. and ed.): *The Basic Writings of Sigmund Freud*, New York: Modern Library, Random House, 1938, p. 272n.

[5] P. Merlan: "Brentano and Freud," *J. Hist. Ideas*, 1945, *6*: 375-377. Freud should not be taken literally on this point. Merlan suggests that Freud studied under Brentano.

[6] S. Freud: *The Origins of Psycho-Analysis, Letters to Wilhelm Fliess*, trans. Mosmacher and Strachey, New York: Basic Books, 1954, p. 126, Letter 29. Freud hoped

he preferred to consider himself a scientific observer of phenomena. And in a paper entitled, "Psychoanalysis and religious origins," Freud had this to say about philosophers: ". . . the delusions of paranoiacs have an unpalatable external similarity and internal kinship to the systems of our philosophers. It is impossible to escape the conclusion that these patients are, in an asocial fashion, making the very attempts at solving their conflicts and appeasing their pressing needs, which, when they are carried out in a fashion that has binding force for the majority, go by the names of poetry, religion and philosophy." [7]

Freud showed a strong determination in his insistence that philosophy must be kept out of psychoanalysis. Calling psychoanalysis an empirical science, he wrote in 1922 that "psychoanalysis is not, like philosophies, a system starting out from a few sharply defined basic concepts, seeking to grasp the whole universe with the help of these, and, once it is completed, having no room for fresh discoveries or better understanding." [8] And in *The Ego and the Id* he commented that there had been a general reluctance to recognize that psychoanalytic research could not produce a completely formulated doctrine, like a philosophical system, but had to find its way gradually along the path toward understanding the intricacies of the mind by making an analytical dissection of both normal and abnormal phenomena.[9] In 1925 Freud wrote another paper, "Resistances to psychoanalysis," in which he criticized philosophy. Discussing the materialistic, mechanistic era of medicine in which psychoanalysis had its beginnings, Freud said:

> . . . it might be supposed that the new theory would be all the more likely to meet with applause from philosophers. For philosophers were accustomed to putting abstract concepts . . . in the forefront of their explanations of the universe, and it would be impossible that they should object to the extension of the sphere of psychology proposed by psycho-analysis. But here another obstacle arose. The philosophers' idea of what is mental was not that of psycho-analysis. The overwhelming majority of philosophers regard as mental only the phenomena of consciousness. For them the world of consciousness coincides with the sphere of what is mental. Everything else that may take place in the "mind"—an entity so hard to grasp—is relegated by them to the organic determinants of mental processes or to the processes parallel to mental ones.[10]

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to be original. He wrote to Fliess: "I do not want to read, because it stirs up too many thoughts and stints me of the satisfaction of discovery."

[7] S. Freud: *Collected Papers*, vol. V, London: Hogarth, 1950, p. 94.

[8] *Ibid.*, p. 129.

[9] S. Freud: *The Ego and the Id*, London: Hogarth, 1927, p. 47.

[10] S. Freud: *Collected Papers*, vol. V, p. 167.

And he added that " to most people who had had a philosophical education the idea of anything mental which is not also conscious is so inconceivable that it seems to them absurd and refutable simply by logic." [11] Freud was attacking the physiological materialism of his time. The behavioristic literature of the early 20th century reflected the Zeitgeist. In 1925 Watson wrote this about Freud: " If ' mind ' acts on body, then all physical laws are invalid. . . . Much of the confusion we have today dates back to Freud." [12] And Freud was clearly going against Descartes's *Cogito* and idealistic tendencies to reduce psychism to consciousness. He avoided, therefore, the idealist's confusion of ego with ego self-knowledge, supported a belief in the unity of the ego, and opposed the Cartesian identification of psychological fact with fact of consciousness.

Freud also criticized philosophers for having made transgressions into psycho-analysis: " Philosophers, who know no kind of observation other than self-observation, cannot follow them [psychoanalysts] into that domain." [13] But here Freud was attacking the philosophy of his day and not Greek philosophy, for later in the same paper he compared the psychoanalytic theory of sexuality with the " all-inclusive and all-preserving Eros of Plato's *Symposium*." [14] In " Some elementary lessons in psychoanalysis " Freud called the philosopher an amateur psychologist and further proceeded to attack modern philosophy:

> But this [equation of what is mental with what is conscious] would not do, since the fact could not long be overlooked that mental phenomena are to a large extent dependent upon somatic influences and on their side have the most powerful effects upon somatic processes. If ever human thought found itself in an *impasse* it was here. To find a way out, the philosophers at least were obliged to assume that there were organic processes parallel to the conscious mental ones, related to them in a manner that was hard to explain, which acted as intermediaries in the reciprocal relations between " body and mind " and which served to re-insert the mental into the texture of life. But this solution remained unsatisfactory.[15]

Yet Freud realized that his view of the " mental " was not the innovation of psychoanalysis. " A German philosopher, Theodor Lipps, asserted with the greatest explicitness that the mental is in itself unconscious and that

[11] S. Freud: *The Ego and the Id,* p. 10. He stated further that the hesitancy to accept an unconscious mental life stemmed from an unawareness of material derived from the studies of hypnosis and dreams " which—quite apart from pathological manifestations—necessitates this conclusion."

[12] W. Watson: *Behaviorism,* London: Kegan Paul, 1925, pp. 242-243.

[13] S. Freud: *Collected Papers,* vol. V, p. 168.

[14] *Ibid.,* p. 169.

[15] *Ibid.,* pp. 378-379.

the unconscious is truly mental. . . . Psychoanalysis has seized upon the concept, has taken it seriously and has given it fresh content." [16, 17, 18]

Interestingly enough, Freud did not believe that philosophy was completely opposed to science.

> . . . it behaves itself as if it were a science, and to a certain extent it makes use of the same methods; but it parts company with science, in that it clings to the illusion that it can produce a complete and coherent picture of the universe, though in fact that picture must needs fall to pieces with every new advance in our knowledge. Its methodological error lies in the fact that it overestimates the epistemological value of our logical operations, and to a certain extent admits the validity of other sources of knowledge, such as intuition.[19]

Freud, as he himself admitted, was no philosopher and perhaps had a "constitutional incapacity" for philosophy.[20] Although he commented on philosophical problems related to psychoanalysis, he was usually thinking in terms of *Naturphilosophie* and Romantic Medicine, the wisdom of Goethe, and the Darwinian evolution, a part of which he must have absorbed as a student of Brentano and a friend of Fliess.[21] Nevertheless, there was a metaphysic rooted in his conception of the unconscious. Fritz Wittels's comments are pertinent:

> The unconscious of psychoanalysis is not to be confused with that of metaphysics. It is true that Freud's theory of the interrelation between consciousness and unconsciousness cannot be more beautifully portrayed than through Plato's famous metaphor . . . the actual things lie beyond our vision where we cannot recognize them. Kant speaks of the *Ding-an-sich*, which we can never know. Schopenhauer taught that the world is our idea, but beyond our idea there is something in nature unrecognizable by the senses, the will. The will creates everything. It determines everything which the human being as an individual and as a member of society does and thinks. There was in Germany a philosopher after Schopenhauer, Eduard von Hartmann, who spoke of the philosophy of the unconscious. His unconscious is

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[16] *Ibid.*, p. 382.

[17] B. Disertori: "Psychoanalyse und Metaphysik," *Schweiz. Arch. f. Neurol. u. Psychiat.*, 1950, *65*: 52-61.

[18] L. L. Whyte: *The Unconscious before Freud*, New York: Basic Books, 1960, p. 169. Whyte remarks that "when Freud was forty-two he was unaware that at least fifty writers (probably many more) had been developing similar assumptions for over two hundred years."

[19] S. Freud: *New Introductory Lectures on Psychoanalysis*, trans. W. J. H. Sprott, London: Hogarth Press, 1933, p. 205.

[20] S. Freud: *An Autobiographical Study*, London: Hogarth, 1935, p. 109.

[21] I. Galdston: "Freud and Romantic medicine," *Bull. Hist. Med.*, 1956, *30*: 489-507, p. 496. "Freud was not a student of philosophy and there is no evidence to show that he came under the tutorial influence of any one else as schooled and biased in these directions as was Fliess."

approximately the same as Schopenhauer's will. Freud's unconscious cannot at first be compared with those metaphysical concepts. One has to admit that in the end it passes over to metaphysics. . . .[22, 23]

Freud's attitude to philosophy, his statements and criticisms of philosophy and its methods, point to the fact that he did not regard himself as a philosopher and in fact feared such an identification, much as did Fenichel [24] and Ferenczi.[25] But even though he was generally unsympathetic to any philosophical system, Freud, unlike Paul Schilder,[26] recognized a number of philosophical anticipations of his own theories and the common ground that psychoanalysis and philosophy share.

II

To the pre-Socratic philosopher, Empedocles of Acragas, Freud made several references. In a short paper entitled, "Analysis terminable and interminable," [27] he discussed the philosopher's explanation of the universe in terms of the four elements, earth, air, fire, and water, and Empedocles' belief in the transmigration of souls and his theory that all nature is animate. But the theory that interested Freud was that of the principle of love and strife, the former uniting the atoms of the four elements into unity, and the latter separating the atoms of the elements. In the Empedoclean theory of love and strife Freud recognized an approximation of his third and final psychoanalytic theory of instincts, although he qualified his statements by adding that the two were not identical: ". . . the Greek's theory is a cosmic phantasy, while our own confines its application to biology." [28] But Freud then modified this difference by conceding that Empedocles applied to the entire universe the same animism he ascribed to individual organisms. Furthermore, the pre-Socratic principles of love and strife "are, both in name and in function, the same as our two primal instincts, *Eros* and *Destructiveness,* the former

[22] F. Wittels: *Freud and His Time,* New York: Liveright, 1931, p. 124.

[23] Brill, *op. cit.,* p. 162. Freud confirmed this when he wrote: "The unconscious is the true psychic reality; *in its inner nature it is just as much unknown to us as the reality of the external world, and it is just as imperfectly communicated to us by the data of consciousness as is the external world by the reports of our sense-organs*" (Brill, *op. cit.,* p. 542).

[24] O. Fenichel: "Some remarks on Freud's place in the history of science," *Yearbook of Psychoanalysis,* 1947, *3*: 9-13, p. 10.

[25] T. Putnam: "Reply to Dr. Ferenczi," *Psychoanalyt. Rev.,* 1915, *2*: 346.

[26] P. Schilder: "Psychoanalysis and philosophy," *Psychoanalyt. Rev.,* 1935, *22*: 274-287.

[27] S. Freud: *Collected Papers,* vol. V, pp. 316-357, pp. 348-349.

[28] *Ibid.,* p. 349.

of which strives to combine existing phenomena into ever greater unities, while the latter seeks to dissolve these combinations and destroy the structures to which they have given rise." [29] Freud did not, of course, follow Empedocles in his theory of the four elements; nor did he fuse animate with inanimate. He did not think of a fusion and separation of atoms; instead, a fusion and separation of instincts. In *An Outline of Psycho-Analysis,* a later work, Freud again mentioned Empedocles' principle of love and strife. "The analogy of our two basic instincts extends from the region of animate things to the pair of opposing forces—attraction and repulsion—which rule in the inorganic world." [30] In answer to those who have opposed such a description of instincts Freud reminded them that the philosopher was familiar with "this picture of the basic forces or instincts," [31] and for him, as for Heraclitus, philosophic speculation must come to an irreducible opposition. In conflict lies the basis of all things.

Tourney compared Empedocles' concepts with the final instinct theory of Freud, developed to explain repetition compulsion and sadistic-masochistic behavior. He referred to Freud's statement that "an instinct [is] an indirect compulsion in organic life to return to a previous state of things" [32] and compared this to his "earlier view in which he conceived the instincts as being impelled toward change and development." He continues: "This is Freud's resolution of the philosophical problem of change and permanency in matter and life, the problem which faced Empedocles twenty-five hundred years ago." [33]

When writing about his dream-psychology Freud found it worthwhile to make some allusions to Plato.[34] Referring to censored dream-wishes, Freud asked: "What does psychoanalysis do in this connection but confirm the old saying of Plato that the good are those who content themselves with dreaming of what others, the wicked, actually do?" [35] Freud again used Plato's saying in the *Interpretation of Dreams.*[36] Freud seemed to

[29] *Ibid.*, p. 350. Cf. also, *An Outline of Psychoanalysis,* New York: Norton, 1949, p. 20.
[30] S. Freud: *An Outline of Psychoanalysis,* p. 21.
[31] *Ibid.*, p. 21n.
[32] S. Freud: *Beyond the Pleasure Principle,* New York: Liveright, 1950, p. 47.
[33] G. Tourney: "Empedocles and Freud, Heraclitus and Jung," *Bull. Hist. Med.*, 1956, *30*: 109-123, p. 113.
[34] E. Jones: *The Life and Work of Sigmund Freud,* New York: Basic Books, vol. I, 1953, p. 56.
[35] S. Freud: *Introductory Lectures on Psychoanalysis,* London: Allen & Unwin, 1922, p. 122. Freud is said to have been an avid reader of Plato.
[36] Brill, *op. cit.*, p. 548: ". . . it would still have been well to recall the words of

believe that science had little to say about the origin of sexuality, and he resorted to a hypothesis for an explanation. This hypothesis, naturally a myth for Freud, was Plato's statement, expressed by Aristophanes, in the *Symposium*: "The original human nature was not like the present, but different. In the first place, the sexes were originally three in number, not two as they are now; there was man, woman and the union of the two . . ." Everything about these primaeval men was double: they had four hands and four feet, two faces, two privy parts, and so on. Eventually Zeus decided to cut these men into two, "like the sorb-apple which is halved for pickling." After the division had been made, "the two parts of men, each desiring the other half, came together, and threw their arms about one another, eager to grow into one." [37] Freud placed surprising emphasis upon the Platonic myth, which dealt, according to him, with the origin of the sexual instinct and its various objective manifestations.[38] But he was careful to add that he was not convinced of the truth of this hypothesis and had no intention of making a cosmological elaboration of *Eros* to explain the evolutionary process.

Many of Freud's followers were also attracted to certain facets of Platonism. Indicative of the appeal of Platonism, a paper published in 1922 by Pfister recounted much of what Freud himself had written in regard to Plato.[39] Going back to many of the philosophers of ancient Greece, Pfister regarded Plato as a philosopher with psychoanalytic insights. He especially appreciated Plato's identification of *Eros* with the sexual instinct and the philosopher's understanding of the role of the sex instinct. Citing the *Symposium* and *Phaedrus,* Pfister alluded to various passages in order to illustrate the comparison he was making. He saw in this philosophical system a further exaltation of the love instinct. *Eros* is directed toward the abstract with love eventually attaining divinity. And Pfister was in agreement with Nachmansohn's observation. Nachmansohn rightly says:

Plato—that the virtuous man contents himself with dreaming of that which the wicked man does in actual life."

[37] S. Freud: *Beyond the Pleasure Principle,* p. 79. Jowett's translation from the Greek.

[38] *Ibid.,* p. 79n. Freud remarked that this notion or myth is found in an early *Upanishad,* where the origin of the world from Atman is given in detail. This has been recognized by others, cf. E. J. Margetts, "The concept of levels of consciousness in the Upanishads," *Canad. M. A. J.,* 1951, *65*: 391, and "The concept of the unconscious in the history of medical psychology," *Psychiatric Quart.,* 1953, *27*: 115-138.

[39] O. Pfister: "Plato: A forerunner of psycho-analysis," *Internat. J. Psycho-Analysis,* 1922, *3*: 169-174.

According to Plato, Eros and love are one and the same thing, whether the love is that of parents for children, or of children for parents, of man for woman, of art or of science, or of love of God. . . . It is interesting that all amplifications of the usual conceptions of the sexual instinct which Freud has made, much to the disgust of so many academicians, are to be found already in the works of the founder of the Academy (Plato).[40, 41]

Pfister was struck by the fact that the unconscious was assumed in Plato's philosophy; and he referred to Otto Wichmann's study which recognized an unconscious in Platonism.[42] But what really appealed to Pfister was the insight of Platonism into love and the "redemption tendency." According to the psychoanalyst, many other philosophers, such as Aristotle, had aspired to a higher order in the egoistic felicity of love; but Plato, on the other hand, saw in love the "striving to free the imprisoned, to heal the sick and raise up the fallen." In developing this point, Pfister termed Plato a Darwinist, since the former permitted infanticide on political and pedagogical grounds to produce better citizens.[43] This interest which Pfister displayed is significant and instructive. But it must be noted that his agreement with Plato, much like Freud's, was both restrictive and qualified. At the end of his paper he wrote: "We do not accompany him into that territory which he himself describes only in mythological pictures, but we must still point out that such a careful positivist as Freud has also found in this source deep inspiration, which has proved of lasting value. In Plato we also find the beginnings of an evolutionistic mode of thought . . . even the theory of sublimation is anticipated." [44] Fritz Wittels also acknowledged Platonic influences in Freud's writings. "It is not mere chance that Freud's libido theory reverts to Plato. Shaftsbury brought to the 18th Century the philosophy of Plato, which conceived of nature as animate." [45] And later in his biography of Freud Wittels mentioned that "Freud discovered the

[40] M. Nachmansohn: "Freuds Libidotheorie verglichen mit der Eroslehre Platos," *Internat. Ztschr. f. Psychoanalyse,* 1915, *3*: 65-83, p. 78.

[41] Pfister, *op. cit.,* p. 169.

[42] O. Wichmann: *Platos Lehre von Instinkt und Genie,* Berlin: Reuther & Reichard, 1917.

[43] B. Jowett: *The Dialogues of Plato,* vol. I (The Republic), New York: Random House, 1937.

[44] Pfister's comparison is lauded in an abstract which appeared in the *Psychoanalyt. Rev.,* 1927, *14*: 100. "By means of apt citations Pfister shows that those Freudian principles which have been so often rejected as offensive and which have gained credence with such great difficulty and are still attacked in many quarters, find their antecedent in the speculations of Plato."

[45] Wittels, *op. cit.,* p. 34.

grammar of the dream and realized an intimation already present in Pythagoras and Plato." [46, 47]

Freud, who had studied the Stagirite,[48] went back to Aristotle a number of times in the *Interpretation of Dreams* to elucidate or substantiate various theoretical points in his dream-psychology. Some pre-Freudian psychologists had said that the dream could be sufficiently well explained by external sensation, while others held to a theory of subjective sensation—each position being somewhat of an extreme of the theory which Freud later developed. Freud examined the contributions of antiquity to dream-psychology before he wrote his monumental work. Freud recognized Aristotle as one of the first ancients who had an awareness of dreams as psychic products.[49] When he examined the role of internal psychic stimuli, as operative in dreams, he noted that Aristotle believed it possible that a dream could focus attention on "incipient morbid conditions which we have not noticed in the waking state." [50] The method of dream interpretation employing symbolic interpretation required, Freud wrote, "extraordinary gifts"; [51] and "Aristotle expressed himself in this connection by saying that the best interpreter of dreams is he who can grasp similarities." [52] It seems that Freud was recalling a sentence from Aristotle's *De divinatione per somnum,* where the latter wrote that "the most skilful interpreter of dreams is he who has the faculty of observing resemblances." [53] And Freud also came close to quoting Aristotle when he declared that the Greek philosopher perceived the semeiological value of the dream.[54] Freud regarded Aristotle's definition of a dream—a continuation of thinking in sleep—as "correct but summary." [55] Indeed, the dream-life is the way one's mind works during sleep, as Aristotle said.[56, 57]

[46] *Ibid.*, p. 400.

[47] A. J. Rosanoff also recognized this anticipation of Freud's dream-psychology. In "Plato and Dostoyevski anticipating Freud," *Psychoanalyt. Rev.*, 1922, *9*: 90, he quoted part of the dialogue between Socrates and Glauco, found in the Ninth Book of *The Republic,* to illustrate Plato's theory of the dream.

[48] Jones, *op. cit.*, vol. I, p. 37.

[49] S. Freud: *The Interpretation of Dreams,* New York: Macmillan, 1933, p. 21.

[50] *Ibid.*, p. 48.

[51] Brill, *op. cit.*, p. 189.

[52] *Ibid.*, p. 189n.

[53] W. D. Ross (ed.): *The Works of Aristotle Translated into English,* London: Oxford, 1950, 464b7-8.

[54] *Ibid.*, 462b10-12.

[55] Brill, *op. cit.*, pp. 497-498.

[56] S. Freud: *New Introductory Lectures on Psychoanalysis,* p. 26.

[57] S. Freud: *Introductory Lectures on Psychoanalysis,* p. 71.

In Freud's chapter, "Symptomatic and chance actions" [58] he asserted that a symptomatic act was expressive of repressed endo-psychic conflicts. Such everyday errors are of interest to philosophy, for they refer to an aspect of causality discussed by Aristotle in his *Physics*. "It is clear then that chance is an incidental cause in the sphere of those actions for the sake of something which involve purpose . . . it might be thought that, in a way, nothing occurs by chance. [But] things *do*, in a way, occur by chance, for they occur incidentally and chance is an *incidental cause*. But strictly it is not the cause—without qualification—of anything. . . ." [59] Although Freud's use of the concept of repression and thematic association was somewhat novel, his notion of chance was not. Causality also entered his dream-psychology. The dream, similar to the symptomatic act, was said by Freud to have unconscious psychic functions as its cause, with the wish as the force behind the dream. In the causality of the dream Freud postulated material as well as active forces; and his dream-psychology could easily be viewed as Aristotelian if one posits that in Freud's system memories and sensations are the material cause of the dream, with the wish as the efficient cause.

Freud's notion of instincts, "forces which we assume to enter behind the tension caused by the needs of the *id*," [60] approximated the Aristotelian analysis of natural appetites and vegetative needs.[61] Both Aristotle and Freud agreed that man is born with an *id*, as far as vegetative needs and instincts are concerned,[62] but man is not born with an actual *ego*—this develops from contact with the environment. Such instincts are elaborated in various directions. One of the means, sublimation, was considered by Aristotle.[63] In Freud's metapsychology sublimation was the changing of sexuality into love for an idealized object; in Aristotle's analysis, it was the changing of sexuality into intellectualized love: the determination of the passion by intellectual objects.

The parallelisms between psychoanalysis and Aristotelian thought were noted by Zilboorg. "Theories of sex and the unconscious have been touched upon, played with and guessed at from the days of the ancients. Aristotle was apparently, at least partially, aware of the problem when he

[58] Brill, *op. cit.*, pp. 129-140.
[59] Ross, *op. cit.*, Book II, Chaps. V, VI, 196b-197a25.
[60] N. Fodor and F. Gaynor, (eds.), *Freud: Dictionary of Psychoanalysis*, New York: Philosophical Library, 1950, p. 98.
[61] Ross, *op. cit.*, 1364b4, 1148a23, 1118a12.
[62] L. S. Penrose: "Freud's theory of instinct and other psycho-biological theories," *Internat. J. Psycho-Analysis*, 1931, *12*: 87-97, p. 88.
[63] Ross, *op. cit.*, 1449b27.

related a certain story in the *De Anima*. A young colt, while grazing in the field, covered a mare but later, on recognizing that the mare was his mother, he jumped off a rock and killed himself." [64] Along these lines Zilboorg attempted to link some of Freud's theories with the observations made by Aristotle and later reformulated, in part, by St. Thomas Aquinas in the 13th century. Zilboorg saw an entire tradition stemming from Pythagoras, Plato, and Aristotle, through Hippocrates and Galen, St. Augustine and St. Thomas, Vesalius, Harvey and Descartes, through the 19th century to the 20th century and Freud, all emphasizing a principal direction of thought; namely, that man has a "soul." Concentrating most of his attention on St. Thomas Aquinas, who elaborated much of Aristotelianism, Zilboorg illustrated not a few parallels between St. Thomas and Freud; for example, the Thomistic "phantasma" is what Freud termed "representation," the inner images which man makes for himself of the external world. And St. Thomas's belief that sensuality is the source of evil "in no way contradicts the psychophilosophical conclusions of St. Thomas or the biopsychological findings of Freud." [65] But Zilboorg insisted in his criticism of those philosophers who, when interpreting Freud's writings, made the methodological mistake of inferentially confusing the Freudian psychic apparatus with the "soul" of philosophy.[66] He maintained that Freud never actually dealt with a philosophical soul and really meant to consider the psyche "as a biopsychological unit." [67, 68] Although much has been written on psychoanalysis and Thomistic thought, it is difficult to relate them historically since Freud did not seem to have any acquaintance with St. Thomas.[69, 70, 71, 72, 73]

Throughout the *Interpretation of Dreams* and *On War, Sex and Neurosis* Freud often referred to the writings of Artemidorus on dream interpretation. Contrasting his own views with those of the second century philosopher, Freud remarked that Artemidorus employed the

[64] G. Zilboorg: "The fundamental conflict with psycho-analysis," *Internat. J. Psycho-Analysis*, 1939, *20*: 480-492, p. 484.
[65] G. Zilboorg: *Mind, Medicine and Man*, New York: Harcourt, Brace, 1943, p. 316.
[66] *Ibid.*, p. 313.
[67] G. Zilboorg: *op. cit., Internat. J. Psycho-Analysis*, 1939, *20*: 488.
[68] G. Zilboorg: *Sigmund Freud: His Exploration of the Mind of Man*, New York: Scribner, 1951, p. 117.
[69] R. Allers: *The Successful Error*, New York: Sheed and Ward, 1940.
[70] R. Dalbiez, *op. cit.*
[71] J. Maritain: *Scholasticism and Politics*, New York: Macmillan, 1940.
[72] M. Adler: *What Man Has Made of Man*, New York: Longmans, 1937.
[73] J. H. Vander Veldt and R. P. Odenwald: *Psychiatry and Catholicism*, New York: McGraw, 1952.

principle of association in his method of dream recall. The thing dreamed, however, was recalled not to the memory of the dreamer, but, instead, to that of the dream interpreter. There is a sharp distinction, Freud wrote, between his own theories and those of the ancients. "The technique which I am about to describe differs from that of the ancients in one essential point, namely, in that it imposes upon the dreamer himself the work of interpretation. Instead of taking into account whatever may occur to the dream-interpreter, it considers only what occurs to the dreamer in connection with the dream-element concerned." [74] But even with such marked differences between theories, Freud quoted Artemidorus on specific points. He showed that the philosopher was familiar with the temporal inversion in the order of dream material,[75] and that the dream symbol of the "room" had been foreseen by Artemidorus. "In interpreting dream stories one must consider them the first time from the beginning to the end, and the second time from the end to the beginning . . . the bedroom signifies the wife, supposing one to be in the house." [76] Freud even compared his own difficulties, as an investigator of sexuality, with those of Artemidorus, whose chapter on sexual dreams in *Symbolisms of Dreams* was expurgated by a translator.

Freud was willing to acknowledge philosophical premonitions of mental phenomena of psychoanalytic interest. While giving credit to men who had recognized the wish-fulfillment mechanism in dreams, Freud added, by way of a footnote, that Plotinus, the teacher of Origen and the inspiration of Porphyry, had been cognizant of this factor. "Already Plotinus, the neo-Platonist, said: 'When desire bestirs itself, then comes phantasy, and presents to us, as it were, the object of desire.'" [77]

Although Freud only once mentioned Spinoza, in a reference to his name in *Wit and Its Relation to the Unconscious*,[78] there are some writers who have seen similarities between Spinoza's ethics and metaphysics and psychoanalysis. Both thinkers accepted an unqualified and strict psychic determinism and stressed the significance of the pleasure-pain principle. Spinoza anticipated the concept of the unconscious by his general interpretation of the affective life of man, and he agreed with Freud that conscious knowledge of emotions and drives are prerequisites to adjustment and that reason is a potent therapeutic factor in controlling the

[74] Brill, *op. cit.*, p. 190n.
[75] *Ibid.*, pp. 352-353n.
[76] S. Freud: *On Dreams*, New York: Norton, 1952, p. 112.
[77] Brill, *op. cit.*, p. 217n. Freud gives Du Prel, p. 276, as his source.
[78] *Ibid.*, p. 678.

passions. Both thinkers showed the existence of " dark primitive libidinal forces in man," the source and nature of asocial drives. Both emphasized the fundamental importance of self-preservation. Spinoza's concept of desire, as the essence of man, is rather close to the Freudian libido, especially when it is " conceived in the words of Brill, ' as a more comprehensive psychical function which strives for pleasure in general.' " [79]

Constance Rathbun reviewed the similarities between Spinoza and Freud. Drawing heavily on Alexander's paper,[80] and Hamblin-Smith's contribution,[81] Rathbun compared the psychology of Spinoza and Freud, stressing the synthetic character of both systems in " attempting to present the mental processes of the individual as a relatively unified whole and not merely as an aggregate of elements." [82] Rathbun then alluded to Walter Bernard's comments on Freud and Spinoza: their determinism, the apparent equivalence of conatus and libido, and the belief that happiness can be achieved by a process of intellectualization of emotions. Even Freud's concept of the unconscious was noted in Spinozistic thinking, if the unconscious is thought of in terms of Spinoza's " confused and inadequate . . . ideas, especially those which correspond to unperceived bodily movement." [83] Rathbun also drew the comparison finer in respect to their *Weltanschauung* and their conception of man's relationship to his immediate environment. The purpose of psychoanalysis is to view man *in toto* in his relationships, " as the nexus of a complex interplay of libidinal forces." [84] Spinoza meant the same thing when he said that the essence of the individual is what is real. Man is not simply a thinking individual; he is a creature of feeling, desire, and impulse. Spinoza, as well as Freud, realized that man is not a completely rational individual. Desire is " at the basis of all emotional life. . . . Psychoanalysis has substituted for Spinosa's conatus the term libido, the creative outgoing life force of the individual, expressing itself in the form of ego and sex impulses." [85]

The psychoanalytic theory of ambivalence is another Spinozistic anticipation of Freud. Spinoza viewed the emotions as springing from three fundamental passions: pleasure, pain, and desire, varying only in proportion and direction to the object. The philosopher also saw the possibility

[79] W. Bernard: " Freud and Spinoza," *Yearbook of Psychoanalysis*, 1947, *3*: 31-47, p. 46.

[80] B. Alexander: " Lessons from Spinoza," *Chronicon Spinozanum*, 1927, *5*: 14-29.

[81] M. Hamblin-Smith: " Spinoza's anticipation of recent psychological developments," *Brit. J. M. Psychol.*, 1925, *5*: 257-278.

[82] C. Rathbun: " On certain similarities between Spinoza and psychoanalysis," *Psychoanalyt. Rev.*, 1934, *21*: 1-14, p. 2.

[83] *Ibid.*, p. 3. [84] *Ibid.*, p. 4. [85] *Ibid.*, pp. 6-7.

of transference of an emotion toward an object which bears a similarity to the original object. Rathbun added, however, that "it remained for Freud to work [this] out in his discussions of the conflicts between love and hate, between the life instinct and the death instinct, and between different stages of development of the same impulse."[86] Having taken considerable pains to illustrate such parallels with detail and precision, Rathbun concluded:

Such similarities as these appear to exist between the thought of Spinoza and the generally accepted concepts of psychoanalysis. There is, I think, no probability of historical influence, but there is a closer alliance of Spinoza's psychology with psycho-analysis than there is with any other modern school of psychology. Such a view of the general relations between these two systems is intended simply as a suggestion rather than as literal proof that the rationalism of Spinoza does not exclude wholly the empiricism of psychoanalysis.[87, 88]

Freud seemed to have some knowledge of modern philosophy. In the *Interpretation of Dreams* he used a quotation from Havelock Ellis to suggest that Hobbes—as well as Albertus Magnus—had an inkling of the concept of repression: "'In sum our dreams are the reverse of our imagination, the motion, when we are awake, beginning at one end, and when we dream at another.'"[89] And in the *Interpretation of Dreams* Freud made some Kantian observations. In his discussion of Hildebrant's work on dreams Freud quoted Kant as saying that the lunatic is the dreamer in the waking state.[90] Freud then ventured into a discussion of Kant's epistemology:

As a result of certain psychoanalytical discoveries we are to-day in a position to embark on a discussion of the Kantian theorem that time and space are "necessary forms of thought." We have learned that unconscious mental processes are in themselves "timeless." This means in the first place that they are not ordered in time, that time does not change them in any way and that the idea of time cannot

[86] *Ibid.*, p. 10.

[87] *Ibid.*, p. 14.

[88] Abstract. *Internat. J. Psycho-Analysis*, 1926, *7*: 492. Acceptance of this comparison is made by the editors in an abstract of Hamblin-Smith's paper: "Every epoch-making hypothesis has had its anticipators, who have grasped after the truth without finding it. Freud's theory, in part, was anticipated by Spinoza, whose system, like Freud's, is based upon a strict determinism. . . . Spinoza grasped the essential character of the sex instinct, and takes the term love in a very extended sense. . . . he understands the influence of narcissism [and one] could not have a better description of the manner in which a repressed desire may be replaced in consciousness by its opposite than that which he gives us."

[89] Brill, *op. cit.*, p. 492n.

[90] S. Freud: *The Interpretation of Dreams*, p. 99.

be applied to them. These are negative characteristics which can only be understood if a comparison is made with conscious mental processes. On the other hand, our abstract idea of time seems to be wholly derived from the method of working of the system Pcpt.—Cs. and to correspond to a perception on its own part of that method of working.[91, 92]

In "The unconscious," [93] a paper published in 1915, Freud asserted that man can postulate the existence of the unconscious through inference—something like the inference made in accepting the existence of consciousness in other men. But Freud realized that this argument would not lead him to the unconscious *per se*. He then made an appeal to Kant's *Ding-an-sich*.[94] "The unconscious is the true psychic reality; in its inner nature it is just as much unknown to us as the reality of the external world, and it is just as imperfectly communicated to us by the data of consciousness as is the external world by the reports of our sense organs." [95]

Reference to Kant is also found in Freud's statements concerning the super-ego and the formation of the conscience. "The philosopher Kant once declared that nothing proved to him the greatness of God more convincingly than the starry heavens and the moral conscience within us." [96] Freud did not take issue with Kant on "the starry heavens," but he did insist that many men have only a limited share of conscience. Freud again criticized Kant's position on moral law in the last chapter of the same work. And Kant's categorical imperative was specifically referred to in Freud's *The Ego and the Id*: "As the child was once compelled to obey its parents, so the ego submits to the categorical imperative pronounced by its super-ego." [97]

Schopenhauer is also prominent in parts of Freud's writings. The German philosopher was credited by Freud with having influenced the thinking of many philosophers and psychologists concerned with the relation of sensation to the mechanisms of oneiric production.[98] Pertinent statements made by Schopenhauer were recalled by Freud. "Utterances like those of Schopenhauer, that in dreams every man acts and talks in complete accordance with his character, are in sharpest contradiction to

[91] S. Freud: *Beyond the Pleasure Principle*, p. 33.
[92] Brill, *op. cit.*, p. 466.
[93] S. Freud: *Collected Papers*, vol. IV, London: Hogarth, 1925, p. 98.
[94] *Ibid.*, p. 104.
[95] S. Freud: *The Interpretation of Dreams*, p. 562.
[96] S. Freud: *New Introductory Lectures on Psychoanalysis*, p. 84.
[97] *Ibid.*, p. 223.
[98] S. Freud: *The Interpretation of Dreams*, p. 51.

those mentioned above."[99] In *Totem and Taboo* Freud mentioned Schopenhauer's belief that death stands at the beginning of every philosophy;[100] and in another work, compiled from lectures at the time he was developing his theory of the death instinct, Freud suddenly made this slight digression:

> You will perhaps shrug your shoulders and say: That is not natural science, that it is the philosophy of Schopenhauer. But, Ladies and Gentlemen, why should not a bold thinker have divined something that a sober and painstaking investigation of details subsequently confirms? And after all, everything has been said already, and many people said the same thing before Schopenhauer. And besides, what we have said is not even true Schopenhauer.[101]

And in *Beyond the Pleasure Principle* Freud added: "For him [Schopenhauer] death is the 'true result and to that extent the purpose of life,' while the sexual instinct is the embodiment of the will to live."[102]

A number of psychoanalytic writers, among them Fritz Wittels, have said with some credibility that Freud derived his *Weltanschauung* from Schopenhauer's philosophy.[103] In 1920 Freud himself wrote:

> Probably very few have realised with what momentous import for Science and Life the recognition of unconscious mental processes is fraught. It was not Psycho-Analysis, however, let us hasten to add, that was the first to make this step. Renowned philosophers may be cited as predecessors, above all the great thinker Schopenhauer, whose unconscious "Will" may be equated with the "mental impulses" of Psycho-Analysis. It was the same thinker, by the way, who in words of unforgettable force reminded men of the significance of their sexual straining, so invariably underestimated. Only that Psycho-Analysis does not stay at abstractly affirming the two theses so painful to Narcissism—the psychical significance of sexuality and the unconsciousness of mental life—but rather proves them by means of a material that touches every individual personally and forces him to face these problems. And this is just why it brings on itself the aversion and opposition which still spare diffidently the names of the great philosophers.[104]

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[99] *Ibid.*, p. 78.

[100] Brill, *op. cit.*, pp. 874-875.

[101] S. Freud: *New Introductory Lectures in Psychoanalysis*, p. 139.

[102] S. Freud: *Beyond the Pleasure Principle*, New York: Liveright, 1950, p. 67.

[103] Jones, *op. cit.*, vol. I, pp. 281, 372, 37. Jones recalled Karpinska's writings which drew attention to the similarities between Freud's fundamental ideas and those of Herbart seventy years previously, particularly the latter's concept of the unconscious, of "verdrängt," and of mental processes "striving for equilibrium." Freud's attraction to Herbart and the Helmholtz school was an expression of his desire to translate psychological data into the "language of physiology" and to avoid any reliance on philosophical systems.

[104] S. Freud: "One of the difficulties of psycho-analysis," *Internat. J. Psycho-Analysis*, 1920, *1*, 17-23, p. 23.

Unfortunately, Freud never developed to any extent his insights into Schopenhauer's philosophy, but several psychoanalysts have attempted this.[105]

W. Bischler also stated that Freud's *Weltanschauung* stems from Schopenhauer's philosophy.[106] By way of proof, he recounted innumerable parallels. He regarded Freud's philosophy as a reduction of the world and life to a complex of forces, interacting cooperatively or antagonistically; as dichotomies of sexual instincts—ego instincts and *Eros*—and *Thanatos*, and as a reduction of intelligence and will to instinct and impulses. Gustav Bergmann had much the same to say in his discussion of the foundations of psychoanalysis.[107] He saw the growth of psychoanalysis as a development of the philosophy of Schopenhauer, as well as that of Nietzsche.[108]

Further examining the philosophy of Schopenhauer, Bischler commented that Schopenhauer sometimes "considers the world from an objective point of view—as Idea . . . ; sometimes he considers it from its subjective angle—as Will." [109] The will of the universe is constitutive of its essence and value. "Every volition, every individual act, every effort, aspiration or wish is nothing but the manifestation of this universal will, as physical bodies . . . represent its objectivation." After enumerating the characteristics of Schopenhauer's will, i. e., instinctive, blind, and voluntary, Bischler added it is a "confused mixture of eros and Thanatos, of creative and libidinal tendencies. . . . Freud's dualism is here substituted by a complete monism." [110] Schopenhauer gave freedom to the thing-in-itself. Freud, however, did not grant freedom to the thing-in-itself; and, in fact, he did not mention a world of noumena. But Bischler did concede that Freud understood the difference and striking contrast between appearance and reality—the manifest and latent content of the dream.

Schopenhauer is also said to have anticipated Freud's theory of art. Although he did not explicitly state that aesthetic activity was analogous

[105] H. Ellenberger: "The unconscious before Freud," *Bull. Menninger Clin.*, 1957, *21*: 3-15.

[106] W. Bischler: "Schopenhauer and Freud: A comparison," *Psychoanalyt. Quart.*, 1939, *8*: 88-97, p. 88.

[107] G. Bergmann: "Psychoanalysis and experimental psychology," *Mind*, 1943, *52*: 122-140, p. 122.

[108] P. Carus: "Wrong generalizations in philosophy. Schopenhauer and Freud," *Monist*, 1913, *23*: 150-151, p. 150. Carus was unsympathetic of both thinkers' use of "wrong generalizations." Schopenhauer's Will was an erroneous generalization "of higher forms of life over all lower manifestations"; and Freud, he thought, "generalizes the lower instincts to cover the highest efflorescence of mental life."

[109] Bischler, *op. cit.*, p. 90.

[110] *Ibid.*, pp. 90-91.

to dream activity, Schopenhauer did believe that art is freedom from the fetters of necessity and the phenomenal world, its object being a vision of pure idea. Schopenhauer, like Freud, regarded art as a fulfillment of "biopsychological function," a substitute for reality.[111] Bischler concluded his comparison with the following summation:

> Both [philosophies] lean to a dynamic, energic and pessimistic conception of life. Both attribute our ills to the domination of our animal and egoistic instincts. Both see deliverance and joy in a half aesthetic, half intellectual . . . state of contemplation, of receptivity, of vision of ideas and external pure truths, born of the unconscious creator. Both also exalt creative and sublimated love; *amor intellectualis, amor veritatis.* The two thinkers diverge . . . on . . . fundamental points. Schopenhauer . . . believes in a noumenon transcending us, in Platonic pure Idea; not distinguishing between creative and destructive instincts, he condemns then *en bloc* and preaches asceticism, self-denial, forgetfulness of self. The psychologist Freud . . . makes a concise analysis of psychological phenomena, which he divides into eros and Thanatos, traces aesthetic and ethical activity to its instinctive sources, and, believing in the purifying virtue of reason, he makes himself the apostle of a pure intellectualism.[112]

It must be remembered in evaluating Bischler's arguments that Freud's concept of the unconscious compared not only with Schopenhauer's Will but also with Kant's *Ding-an-sich,* as well as with von Hartmann's notion of the unconscious, which is approximately the same thing as Schopenhauer's Will. In fact, the concept of the unconscious has a monumental place in the history of ideas, so great that neither Freud nor Schopenhauer could claim it as his own. Yet Freud acknowledged in the *History of the Psychoanalytic Movement* [113] that his theory of repression was to be found in Schopenhauer's *The World as Will and Idea,* but he claimed originality by pleading ignorance of all philosophy.[114]

It is doubtful that Freud had only a slight acquaintance with the philosophy of Nietzsche since it was so popular a philosophy during his day and Freud had read Edward von Hartmann's *The Philosophy of the Unconscious,* in which many Nietzschean ideas were expressed. In fact, Freud said at a meeting of the Vienna Psychoanalytic Society in 1908 that he had tried to read Nietzsche and found that Nietzsche "had a more penetrating knowledge of himself than any other man who ever lived or was ever likely to live." [115] But only a few times did Freud make any

[111] *Ibid.,* p. 92. [112] *Ibid.,* p. 97. [113] Brill, *op. cit.,* p. 939.

[114] It was Otto Rank who suggested to Freud that Schopenhauer had a similar notion of repression. Freud's answer was that he was not familiar with Schopenhauer's writings, cf. Brill, *ibid.*

[115] Jones, *op. cit.,* vol. II, 1957, p. 344.

direct reference to Nietzsche in his writings. Discussing the affective factors of memory Freud added that

> . . . none of us has been able to represent this phenomenon and its psychologic determination as exhaustively, and at the same time as effectively, as Nietzsche in one of his aphorisms (*Jenseits von Gut und Böse,* ii., Hauptstück 68): "'I have done that' says my Memory. 'I could not have done that,' says my Pride and remains inexorable. Finally, my Memory yields."[116, 117]

And Nietzsche, who wrote "there persists a primordial part of humanity which we can no longer reach by a direct path"[118] was among those who had apprehensions of the true significance of dreams. It even seems that Freud used a Nietzschean term: "Borrowing, at G. Groddeck's suggestion, a term used by Nietzsche, we will call it henceforward the 'id.' This impersonal pronoun seems particularly suited to express the essential character of this province of the mind—the character of being foreign to the ego."[119] And Freud called his mechanism of dream displacement "'a transvaluation of psychical values,'" using the Nietzschean phrase.[120]

Yet Freud never commented on Nietzsche's understanding of the dynamics of hostility and resentment in altruism and morality, the interiorization of instincts, the demands of aggression and the relation of artistic energy and sexuality, which in *Genealogy of Morals*, published in 1887, suggested much of what Freud later wrote about symptom-formation, repression, reaction-formation, and sublimation.

It is at this point in the history of ideas that a curious omission is apparent. Although Freud and Husserl were contemporaries and published their chief works in 1900, and although both had studied under F. Brentano, no mention of Husserl's phenomenology was made by Freud. Furthermore, Freud did not indicate any awareness of Schilling and Kierkegaard, who began the existence movement,[121] and Nietzsche was partially ignored. Extending the development of existence, Heidegger and Jaspers elaborated Nietzsche's philosophy of life and Husserl's phenomenology. But this phase of the growth of existentialism was also overlooked by Freud. Perhaps Freud was too preoccupied in the development of his own theory of man. But it seems more likely that Freud, the anti-philosopher, was determined to keep philosophy out of psychoanalysis

[116] Brill, *op. cit.*, p. 103n.
[117] Wittels, *op. cit.*, p. 126.
[118] Quoted in Brill, *op. cit.*, p. 497.
[119] S. Freud: *New Introductory Lectures in Psychoanalysis*, p. 97.
[120] S. Freud: *On Dreams*, p. 53.
[121] P. Tillich: "Existential philosophy," *J. Hist. Ideas*, 1944, *5*: 44-70.

and was fearful of being enmeshed in philosophical polemics.[122, 123, 124, 125] This was suggested by Wittels, Freud's early biographer, and more recently confirmed by E. Jones, who felt that Freud had a strong but ambivalent interest in philosophy; he distrusted and even feared it.[126] Freud believed that his penchant for philosophy "needed to be sternly checked and for that purpose he chose the most effective agency—scientific discipline."[127] Nevertheless, Jones recognized that "the ultimate questions of philosophy were very near to him [Freud] in spite of his endeavor to keep them at a distance and of distrusting his capacity to solve them."[128]

Perhaps it was for this reason that Freud translated his metapsychology into a scientific framework natural to his day and concentrated on the biological aspect of man—the *Umwelt* of ontological *Daseinsanalytik*—and chose to avoid the *Mitwelt* and *Eigenwelt*.[129, 130]

[122] K. Jaspers: "Zur Kritik der Psychoanalyse," *Nervenarzt*, 1950, *21*: 465-468.

[123] F. Baumeyer: "Jaspers und die Psychoanalyse," *Nervenarzt*, 1952, *23*: 153-154.

[124] A. Mitscherlich: "Wanderversammlung der südwestdeutschen Psychiater und Neurologen, Badenweiler, I. Daseinsanalyse," *Psyche*, 1950, *4*: 226-240.

[125] Wittels, *op. cit.*, p. 94.

[126] Jones, *op. cit.*, vol. II, p. 344.

[127] *Ibid.*, vol. I, p. 295.

[128] *Ibid.*, vol. II, p. 432.

[129] R. May *et al.*, (eds.): *Existence*, New York: Basic Books, 1958, pp. 34, 314-315. Binswanger says that Freud's scientific approach was fitted to analyze the *Umwelt*, but not the *Mitwelt*.

[130] Tiebout, *op. cit.*

THE WILLIAM OSLER MEDAL ESSAY

THE THEORY OF HEREDITARY DISEASE OF LUIS MERCADO

CHIEF PHYSICIAN TO THE SPANISH HAPSBURGS.*

DAVID F. MUSTO

INTRODUCTION

Luis Mercado presented in *De morbis haereditariis* (1605)[1] an advanced and impressive analysis of hereditary disease. Investigation of this problem, which for centuries was of great personal, religious, and dynastic concern, had by the Renaissance stagnated through an uncritical addiction to formulae of Aristotle and Galen. Most physicians believed that such factors as the imagination and the phases of the moon could cause hereditary disease and used traditional treatments, for example purging and bloodletting, to eradicate the unsound traits. It was against this background that Mercado wrote and, although historians of biology

* This is a revised version of the essay submitted for the Osler Medal. The author wishes to express his deep appreciation to Miss Jeanne Baudendistel for her technical assistance and to Professor Harry Woolf, Dr. James W. Haviland, and Professor Francisco Guerra for their advice and encouragement.

[1] The earliest date we have found for the publication of *De morbis haereditariis* is 1605, when the treatise was included in vol. 2 of Mercado's *Opera omnia* published at Madrid. It is not certain, however, that the work was written in 1605 or within a few years of that date. Palau (*Manual del librero hispano americano*, 2nd ed., Barcelona: Libreria Palau, 1956, vol. 9, p. 87) records that Mercado decided in 1594 to publish his collected works; in that year at Valladolid was published the *Tomus tertius: In quo, libri quatuor de morborum internorum curatione, nunc primum in lucem editi continentur. Libri etiam quatuor de mulierum affectionibus, variis additionibus locupletati, & summa diligentia correcti.* . . . Not until 1605 was there a publication of *Tomus secundus: in quinque partes divisus. Prima, de recto praesidiorum artis medicae usu, continet duos libros. Secunda, de febrium: in septem libros dissecta. Tertia disseret de pulsus arte et harmonia: continet septem tractatus. Quarta morbi gallici naturam et curationem duobus libris complectitur. Quinta de morbis haereditariis egregie disputat.* During the previous year was published the *Tomus primus: De veritate et recta ratione principiorum ac theorematum, & rerum omnium, quae in medica facultate tractantur: in tres libros divisus. Liber primus de constitutione & fabrica corporis humani. Liber secundus de sanitate, & de arte ipsam conservandi ac praecauvendi, iuxta varietatem temporum & aetatum. Liber tertius de his omnibus quae tam ad morborum, symptomatum et causarum naturam.* . . .

have generally ignored the treatise, its pages contain an acute observer's doctrine of inheritance.[2]

It is curious that Luis Mercado was one of the most celebrated physicians in Spain during its Golden Age, but that nevertheless few details are available, especially in the English language, about his life or extensive writings. Many biographical sketches of Mercado have been uncritical and inaccurate. Even the decade of his death was in dispute during the eighteenth and nineteenth centuries, despite the fact that at his death he was the Chief Physician of the Spanish Empire. The information we can now relate with assurance is the result of careful historical research by Cortes and Alcocer.

Because of the confusion over the life of Mercado, it seems fitting to give some biographical information. A brief history of ideas about hereditary disease and a study of *De morbis haereditariis* will follow. Through these I hope to demonstrate that Mercado and his work deserve reconsideration.

1. The Life of Mercado

Mercado's life was closely associated with the lives of the Spanish rulers. The most probable date of his birth, 1525, follows by six years the accession of Charles V to the throne of the Holy Roman Empire and precedes by two years the birth of Philip the Prudent. Mercado, then, was about the same age as his illustrious patient. Mercado followed the profession of his father, Pedro de Ordas, a physician, but, as was common at the time, assumed the name of his mother, Maria de Mercado. Born in Valladolid, he attended the University there, which, along with Alcalá and Salamanca, was one of the three leading schools of medicine in Spain. From the University of Valladolid he received his Licentiate about 1556 and on the 26th of May 1560 " la investidura de doctor." [3] In the interval between the licentiate and the doctorate, if he followed the customary course, he had taken a two-year apprenticeship and a year or more of advanced studies.

Medicine was taught at the University of Valladolid for several centuries before Mercado's day, although the documents and details are

[2] The translation of *De morbis haereditariis* was made by the writer while a Research Fellow at the University of Washington School of Medicine supported by the Research Training Grant awarded to the University of Washington by the National Institutes of Health.

[3] Mariano Alcocer y Martinez, *Historia de la Universidad de Valladolid; Bio-bibliografias de medicos notables por el cronista de la Universidad* (Valladolid: Talleres Tipograficos " Cuesta," 1931) p. 77.

not easily available. From the work of Alcocer, we can state that while Mercado was a student the faculty of medicine had at least four chairs: (1) the chair of medicine founded by Henry III in 1404; (2) the chair *Prima de Medicina de Avicena* of unknown foundation date which Charles V, on 24 December 1534, divided and so added (3) the chair *Visperas de Medicina de Avicena;* lastly (4) the chair *de Metodo,* of unknown foundation date.[4] Entry into medical school required a Bachelor's degree. The curriculum leading to the *licenciado* was three years in length during which Anatomy (*natura hominis*), Physiology (*de usu partium*), Pathology (*de locis morborum*), and therapeutics (*methodus medendi*) were studied.

After his doctorate, Mercado probably continued teaching at the University. He had married Doña Juana de Toro around 1555, and their marriage produced nine children, six of whom reached adulthood. In 1572 the chair *Prima de Medicina de Avicena* was vacated by the death of Fernando Rodriguez and a contest was held to determine his successor. Mercado, now forty-seven, was chosen and, on 1 August 1572, he took over his new duties by virtue of which he became the leader of the medical faculty.[5] At his jubilee twenty years later, among other tributes it was said that he had not been absent a day from his responsibilities.

Philip II appointed Dr. Luis Mercado physician to the King's chamber on 14 September 1592,[6] and later *protomedico general de los reinos de España.*[7] As *protomedico general,* Mercado, assisted by his tribunal, oversaw Spanish medicine, setting up standards for practice and license, and acted as final court of appeal in proceedings against physicians. Meetings were held in the treasury of the royal palace, *El Escorial.*

Mercado's publications, beginning with *Ways of Treatment,* date from his first professorship at Valladolid in 1572[8] and are predominantly

[4] *Ibid.,* pp. v-vi.

[5] Rodriguez was Mercado's sponsor "en el acto de recibir la investidura de doctor." ("El doctor Mercado," *Practica medica* (Madrid), 1943, *1*: 4).

[6] E. Subiza, "Los medicos de Felipe II. Aportacion a su estudio," *Arch. iberoam. de hist. de med.,* 1954, *6*: 386.

[7] "El doctor Mercado," *loc. cit.*

[8] *Methodus medendi* (Valladolid, 1572). Mariscal (*El libro de la peste del Dr. Luis Mercado, Biblioteca clásica de la medicina española,* Madrid: Julio Cosano, 1921, vol. 1, pp. 39, 40) was unable to find, for any of Mercado's works, a publication date as early as 1572. He suggests that Mercado's first publication might be *De communi et peculiari praesidiorum artis medicae indicatione* (Valladolid, 1574). The 1572 date for *Ways of Treatment* is supported by Petrus Castellanus (*Vitae illustrium medicorum,* Antuerpiae, 1618) who is quoted by Nicolas Antonio (*Bibliotheca hispana sive hispanorum,* N. A. Tinassi, 1672, vol 2, p. 40), and again by Joannis Jacobi Mangeti (*Bibliotheca*

scholastic in style. He was remembered after his death primarily for his books on fevers,[9] and on the epidemiology of the plague.[10] He did not limit himself to the well-known, practical topics of medicine; considerable praise has been given to his work *On the True and Correct Method of the Principal Theories and Matters Relating to Medical Science,* a work of great breadth and the culmination of his philosophical studies.[11] He discussed how to raise and educate children in a publication in 1611 at Valladolid.[12]

Other duties devolved upon him, the most important being that of adviser to the Royal Finance Council.[13] Petrus Castellanus, writing six years after Mercado's death, described him as standing " in highest favor with men of all classes, in whom he inspired confidence in his ability by his example, retaining his keen sense and his clear mind unfailingly in extreme old age." [14] Ullersperger, the nineteenth century historian of science, upholds this description as he refers to Mercado's " ingenious sagacity " in the discharge of his official duties, and to his depth of thought and wide knowledge. Ullersperger places Mercado above his illustrious contemporary, Francisco Valles (1524-1592), as a physician and a man of learning.[15]

Religion dominated Mercado's life. Spain, of course, was the chief enemy of the Reformation and a fervor dwelt within its inhabitants; one cannot imagine an indifferent member of Philip's court. In the midst of this pervading religious mood, two of Mercado's daughters and two of

scriptorum medicorum, Genevae: Sumptibus Perachon et Cramer, 1731, vol. 2, pt 1, p. 306).

[9] *De essentia causis signis & curatione febris malignae in qua maculae rubentes similes morsibus pulicum per cutem erumpunt.* (Pinciae: D. F. à Corduba, 1574). Revised editions appeared in Valladolid, 1586; Basel, 1594; and Padua, 1595.

[10] *Libro en que se trata con claridad la naturaleza, causas, providencia y verdadera orden y modo de curar la enfermedad vulgar, y peste que en estos años se ha divulgado por toda España* (Madrid: Castro, 1599).

[11] *De veritate et recta ratione principiorum theorematum et rerum omnium, quae in medica facultate tractantur* (Valladolid, 1604). This opinion is taken by Hernández Morejon (*Historia bibliográfica de la medicina española,* Madrid: Jordan, vol. 2, 1843, p. 141), and by F. H. Garrison (" An epitome of the history of Spanish medicine," *Bull. New York Acad. Med.,* 1931, 2nd s. *7*: 589-634).

[12] *De puerorum educatione, custodia et providentia* (Valladolid, 1611; 1613; Frankfort, 1654).

[13] " El doctor Mercado," *loc. cit.*

[14] " Ob id omnium hominibus aeque carus exstitit, quibus etiam artis suae fidem exemplo comprobat, quum sensus integros, et perpetuam mentis constantiam in suprema senectute conservarit." Petrus Castellanus, *loc. cit.*

[15] Johann B. Ullersperger, " Biografia y bibliografia del médico español Luis Mercado," *An. r. Acad. de med.,* 1881, *3*: 360.

his sons entered religious orders. Mariscal finds evidence that another son became an attorney in Salamanca.[16] Pedro Jordan's eulogy prefacing the treatise, *Concerning the Treatment of Internal Diseases*, warmheartedly praises Mercado's way of life:

> Mercado was a man full of virtues, modest in dress, sparing in diet, humble in character, simple in manner; his home was a small temple of piety and religion; thus for his children, from one house of prayer they moved on to another.[17]

Dr. Nicasio Mariscal has drawn attention to an early record of court historian Cabrera de Córdoba, covering the years 1599 through 1614. In this document Mercado's name is mentioned in connection with the illnesses of the royal family, and always as the chief and most respected physician.[18]

Following the death of Prince Alonso in 1611, Mercado requested that he be allowed to retire to Pisuerga, writes the court historian. On 18 December 1611, Cabrera states that Mercado, in the first half of the month, died in Valladolid at the age of eighty-six.[19]

[16] Mariscal, *op. cit.*, p. 35. In 1631 Mercado's name was included in a list of physicians of Jewish origin in Benedict de Castro's apology, *Flagellum calumniatium* (Hamburg, 1631). Attempting to offset attacks by those who would eliminate Jews from the medical profession, De Castro describes Mercado as "the most brilliant of his period, to be named among the most learned of the ancients, the leading professor at Valladolid and most honored of the royal physicians." De Castro is quoted by Friedenwald (*The Jews and Medicine: Essays*, Baltimore: Johns Hopkins Press, 1944, vol. 1, p. 328).

[17] Ludovicus Mercatus, *Opera omnia*, ed. Z. Palthenius (Frankfort: Palthenius, 1620), preface, Tom. III. Jordan was a member of the medical faculty at Valladolid and physician to the Holy Inquisition.

[18] Cabrera de Córdoba, *Relaciones de las cosas sucedidas en la córte de España desde 1599 hasta 1614* (Madrid, 1857, 1st. ed. 1619).

[19] *Ibid.* Writes Cabrera, "Murió el doctor Mercado en Valladolid, Medico de la camera el mas acreditado de los que servian a sus Magestades." Narciso Alonso Cortés ("Gomez Pereira y Luis Mercado," *Revue hispanique*, [New York] 1914, *31*: 62), states that according to the death records of the parish of Antigua in Valladolid, Mercado died in the first part of December, 1611. Castellanus (*loc. cit.*) recorded that Mercado lived eighty-six years but mentions no date of birth or of death. He gives the incorrect impression that Mercado served Philip II for twenty years; actually, those twenty years included service to both Philip II and Philip III. Castellanus' particulars on Mercado are quoted by Nicolas Antonio (*loc. cit.*), who, in turn, is quoted by Mangetus (*loc cit.*). In 1824 A. J. L. Jourdan (*Biographie médicale*, vol. 6, p. 252) writes that Mercado died in 1599 at eighty-six and adds that he was born in 1513. In 1843 A. H. Morejon (*op. cit.*) argues that Mercado died in 1606 and therefore was born in 1520. For almost eighty years 1606 stood as the date of death. Not until the Cabrera documents were rediscovered, and Cortés found the death record, was the true date of his death determined. Still, in most English texts 1520-1606 spans Mercado's life. An interesting variation of the Mercado dates is provided by Castiglioni, who adopts 1606 for the death, but lists 1541 for Mercado's birth. That is the birth of a Mercatus, an Italian physician named Michael, but not Luis.

2. A Summary of the Doctrines of Heredity up to the Publication of *Concerning Hereditary Disease.*

> . . . It is likely I inherited the gravel from my father, for he died sadly afflicted by a large stone in his bladder. He did not become aware of the disease until his sixty-seventh year. Before that, he felt neither menace nor pain in his reins, sides or elsewhere. He had lived in robust health and seldom subject to illness. Then for seven years he endured this affliction, painfully dragging out the end of his days.
>
> I was born when he was in his prime, twenty-five years or more before the disease appeared—the third of his children in order of birth. While he was still so remote from the disease, how could the light trifle of his substance out of which he built me convey so deep an impress? And how could it have remained so hidden that I did not perceive it until forty-five years later? Moreover, I am the only child among many brothers and sisters born of one mother that was ever troubled with it. Where could the propensity have been brooding all this while? The doctor who can satisfy me on this point I'll believe as many miracles of as he pleases, provided he does not give me—as doctors usually do—a theory more intricate and fantastic than the thing itself.[20]
>
> —Montaigne, 1580

Mercado's work, preceding discoveries of sperm and ovum by microscopists, is found at the end of about two millenia of gross observation and inference which attempted to construct the proximate causes of generation. A few fundamental ideas were recombined and rephrased with ingenious variety. The two oldest concepts were pangenesis, the gathering of seeds from the various parts of the body to form the complete seed,[21] and the inheritance of acquired characters, the belief that changes in the body during life could be transmitted to one's progeny. Often folklore and physicians maintained that one sex (to our knowledge the male only) determined the child's heredity. Perhaps early conjecture on the origin of the human seed favored a collection of seed from the parts of the body channeled through one of the major organs. The writers of the Hippocratic Corpus (c. 400 B. C.) chose the brain and spinal cord as the organs mediating semen production. The source of the seed was " from the whole body, from the solid parts, and from all the humors which are in the

[20] Michel de Montaigne, "De la ressemblance des enfans aux pères," in *Essais de Montaigne,* livre II, chap. 37, *Bibliothèque de la Pléiade,* vol. 14, ed. Albert Thibaudet, (Bruges: Librairie Gallimard, 1958) p. 854. The translation is from Marion Lowenthal, *Autobiography of Michel de Montaigne,* (New York: Vintage Books, 1956).

[21] Darwin developed the idea of a seed proceeding from every part of the body in *The Variations of Animals and Plants under Domestication* (New York, 1868). The term 'pagenesis' is used in this paper to refer to any system based upon the assumption that every part of the body contributes to the seed, although the word is original with Darwin.

body." [22] This school made no distinction between the generating powers of the male or female. The ovaries were the female testes; both sexes contributed seed.

The pangenesis doctrine was enhanced by an appearance of common sense, and by the specious solution of difficult problems. The resemblance of off-spring to parents was easy to note, but puzzling to explain. Even more awkward and distressing to medical theorists was the inheritance of defects, which ranged from the curious to the crippling. On the assumption, however, that a particle came from each part of the body and implanted itself into, or formed, the seed the similarities could be easily explained. If a parent lacked a part, its absence in the young would be easily accounted for, the parent having given no generative particle from that place. The presence of a healthy part in the child of a cripple would be explained by the seed from the other parent (or by that other parent's healthy influence if the theory maintained that only one parent ever contributes a seed). This simplicity and adaptability exerted such an attraction on physicians for the next twenty-odd centuries that almost no one denied it.

Tied with the particle-from-every-part concept was the belief that acquired characters are inherited. Hippocrates relates the story of the Macrocephaloi, the people of Asia Minor who bound their children's heads to make them long-shaped.[23] After this practice had continued for many generations, it was said, the children were born so marked. This account is one of the most durable in medical literature; author after author uncritically accepts and retells the tale, Mercado among them, and unfortunately feels obliged to fit it satisfactorily into his theory.

As mentioned, the practicing physician found in these theories reasons for hereditary defect and strange occurrences, as well as some sizable loopholes for paradoxical exceptions. Philosophers were more critical. Lucretius (95-55 B. C.) denied the possibility of the inheritance of acquired characters; he sensed that if this notion were true, the stability of species would be eliminated, and that since species appeared to be well demarcated, changes brought about in life could not be transmitted.[24] However, in *De rerum natura* he explains similarities to past generations by primordia of ancestors' characteristics found within a parent's body.[25]

[22] Hippocrates, "De la génération," in *Oeuvres complètes d'Hippocrate*, ed. Littré, (Paris: J. B. Baillière, 1851), vol. 7, § 6, pp. 478-479).

[23] Hippocrates, *Airs, Waters, Places*, trans. W. H. S. Jones (London: Heinemann, 1923) chap. xiv, p. 111.

[24] *De rerum natura*, I, 167-168.

[25] *Ibid.*, IV, 1218-1222.

The first to combat pangenesis was Aristotle (380-323 B. C.). He rejected the common solution on the grounds that children resemble parents in their speech and manners from which no particle can arise, that inheritance of mutilations is a very rare event, and for several other reasons which are now less impressive.[26] Aristotle concluded that the female provided only the material for the child, the male only the active principle which set in motion the organization of the material. The male, then, transmitted nothing material to the female, but gave only this principle or spirit.[27]

In the patriarchies the belief that the father dominated a child's hereditary makeup was very common. On the Athenian stage Aeschylus has Apollo say:

> The mother is not the true parent of the child
> Which is called hers. She is a nurse who tends the growth
> Of young seed planted by the true parent, the male.
> So, if fate spares the child, she keeps it, as one might
> Keep for some friend a growing plant.[28]

In the second century of our era, Galen made an attempt to reconcile the Hippocratic and Aristotelian attitudes toward generation. He recognized in the seed not only the active principle which Aristotle introduced, but also a contest between the male and female seeds resulting from the quantity given by each parent.[29]

During the following fourteen centuries not much new information and few new theories were advanced. Avicenna (980-1037) generally accepted Galenist physiology of reproduction. "But the masculine semen is the stronger in the power of the inception of formation," he reasoned, "by the command of God. And the feminine semen is very abundant in the power of taking on form."[30]

In the thirteen the century, St. Thomas Aquinas examined the doctrines anew[31] and produced what Zirkle calls "perhaps the most detailed dis-

[26] Aristotle, *Generation of Animals*, trans. A. C. Peck (London: Heinemann, 1953) I, 721a31-724a14.

[27] *Ibid.*, I, 729a9-14.

[28] "Eumenides," *Aeschylus: The Oresteian Trilogy*, trans. Philip Vellacott (Harmondsworth, Middlesex: Penguin Books, 1959), p. 169, lines 657-661.

[29] Ancient theories of heredity have been discussed in considerable detail by Erna Lesky, *Die Zeugungs- und Vererbungslehren der Antike und ihr Nachwirken*, Verl. d. Akad. d. Wiss. u. d. Lit. in Mainz, in Komm. bei Steiner, Wiesbaden, 1951. (Abh. d. geistes.— u. sozialwiss. Kl. 1950, no. 19).

[30] Avicenna *Liber canonis* (Venetiis: Juntas, 1582), III, fen. 20, tract. I, cap. 3, "De causis spermatis."

[31] Aquinas' most extensive discussion of pangenesis is in his *Commentum in quatuor*

quisition on pangenesis ever written." [32] St. Thomas accepted the idea that acquired characters are inherited and his analysis of this greatly influenced later writers.

Passing centuries brought little more than a reshuffling or change of emphasis in the variety of explanations. Outside the writings of philosophers and naturalists, speculation was more extravagant. Many believed that defects were the act of God and served as punishment to the parents of the child.[33] As the sixteenth century opens we have not traveled as far as the centuries might suggest. The origin of the semen and the relative roles of the parents were still matters which physicians debated. Pangenesis and the inheritance of acquired characters were widely accepted.

Luis Mercado was eighty and had served the Hapsburg ruler as personal physician for 13 years when, in 1605 at Madrid, *De morbis haereditariis* was published. Not very lengthy, its approximately 9000 words are contained in ten and one-half, double-column pages of the 1800 page folio edition of his collected works published in 1620 at Frankfort.[34] Philip ordered and bore the costs of the Mercado treatises on the plague,[35] and likewise his examiner's book for *algebristas*.[36] Mercado's style tends toward prolixity but is grammatically correct. It exemplifies the Renaissance aversion to Vulgar Latin and conscious imitation of classical models. He adopted some Greek transliterations, but these were probably not original with Mercado since, as Ullersperger points out, he did not read Greek but gained his knowledge through Latin translations.[37] He frequently chooses words with post-classical meaning or derivation: *finitio, substantifix, curatoria, possibilis,* and *suscepto* were rarely or never employed in classical Latin. These and similar words so habitually used in his time challenge our understanding, as does his philosophy which supplies their context.

libros sententiarum magistri Petri Lombardi, Dist. XXX, Q. II, Art. II, ed. English Franciscan Fathers (London: Burnes, Oates & Washbourne, 1911-1917).

[32] Conway Zirkle, "The early history of the idea of the inheritance of acquired characters and of pangenesis," *Trans. Am. Philos. Soc.*, n. s. vol. 35, pt. 2, p. 125 (Philadelphia: American Philosophical Society, 1946).

[33] Joseph Needham, *A History of Embryology* (Cambridge: University Press, 2nd ed., 1959) p. 113.

[34] *Opera omnia*, Frankfurti, sumpt. haered. Z. Palthenii, 1619-1620.

[35] *Libro in que se trata con claridad la naturaleza, causas, prouidencia, y verdadero orden y modo de curar la enfermedad vulgar, y peste que en estos años se ha diuulgado por toda España* (Madrid, 1599).

[36] *Instituciones para los algebristas* (Madrid, 1599).

[37] Ullersperger, *op. cit.*, pp. 360-361.

3. Mercado's Theory of Hereditary Disease

Not only did Mercado live when the scholastic heritage was a universal component of education, but he also wrote amidst a great revival of that metaphysic. Copleston, a modern scholastic philosopher and historian, writes:

> The chief center of this scholastic revival was Spain, in the sense that most, though not all, of the leading figures were Spaniards. . . . Spain was comparatively untouched by the ferment of Renaissance thought or by the religious dissensions of the Reformation; and it was only natural that a renewal of studies which was carried through predominantly . . . by Spanish theologians should take the form of a revivication, prolongation and development of Scholasticism.[38]

Mercado fitted his observations and reached his conclusions within the framework of this system of thought. He repeatedly refers to terms familiar and instinctive to the scholastics—*forma, natura, habitus,* etc. Mercado has been severely criticized for his use of philosophical terminology. Sprengel states that Mercado can be appropriately called the "Thomas Aquinas of Medicine"—not for Sprengel a title of esteem—because "il enveloppe cette simple vérité dans un tel tissu d'antithèses subtiles, et s'exprime d'une manière à la fois si barbare et si obscure, qu'on ne peut lire sans dégoût une page entière de ses écrits."[39] Nevertheless, Mercado developed for the study of heredity a scheme which in itself marked an advance for his era, and which would have provided a firm foundation for sound statistical and experimental investigations.

A. *Facultas formatrix.* The process of reproduction, as outlined by Mercado, flows regularly with almost no influences externally induced, i. e. seasons of the year, the imagination, or an accidental injury. The driving force behind the process of reproduction and the formation of the seed is the forming faculty (*facultas formatrix*). Mercado's use of the term *facultas* remains consistent with that which Galen explained: "So long as we are ignorant of the true essence of the cause which is operating, we call it a faculty."[40]

[38] Frederick C. Copleston, *A History of Philosophy* (London: Burns, Oates & Washbourne, 1947-59), vol. III, p. 355.

[39] Kurt Sprengel, *Histoire de la médecine,* trans, A. J. L. Jourdan (Paris, 1815), vol. II, p. 22. This description is unfair; it was stimulated by Sprengel's reading of one particularly abstract volume and was not based upon the whole of Mercado's writings. Sprengel's ire was aroused by *De veritate et recta ratione . . .*, (*loc. cit.*). See the detailed reply to Sprengel by Morejon, *op. cit.*, vol. 2, pp. 138-151.

[40] Galen, *On the Natural Faculties,* trans. A. J. Brock (London: William Heinemann, 1916), bk. I, iv, p. 17.

The forming faculty influences both the formation of the seed and the embryological development which proceeds from the seed. We can compare this concept of the faculty and seed to a machine turning out products from a template; the faculty works out and produces whatever the seed gives it as a model. Mercado believed that rarely, if ever, could anything interfere with the workings of the forming faculty. He considered it to be a universal feature of nature, with actions in "higher" animals differing from its actions in animalculae and inanimate objects. In the latter, the faculty does not reproduce individual similarities, but rather reproduces the species of which the individual is a member.

> The formative faculty is, for the most part, distributed from the heavens, producing plants and animalculae, metals and stones both in the water and in the air, on and under the earth. Moreover, this faculty remains an act not individuated by matter, so that one specific form of the rose or of the mallow, another of the worm, is generated.[41]

Aristotle describes the spontaneous generation of low forms of life, e. g. plants, receiving the psychical principle from the air.[42] Aside from Aristotle, Mercado may have been closely influenced by Paracelsus, who believed that the air was the source of life for all things and that metals and minerals had a spirit just as did plants.[43] Mercado's passage on the formative faculty which is quoted above appeared also, but in a slightly varied form, in his treatise *Concerning the Afflictions of Women,* first printed in 1579.[44] In the interval between the two publications, Mercado added "metals and stones" to the list of things formed by the formative faculty.[45]

When Mercado refers to "an act not individuated by matter" producing "one specific form" he means a force detached from individual

[41] 435.II.A. (In quoting from *De morbis haereditariis* we refer to the 1611 Venice edition of Mercado's works. The first number is the page, the Roman numerals refer to the first or second column, and the letter indicates how far down the column the passage is found on a scale of 'A' to 'E'). "Quippe facultas formatrix plurima a coelo expanditur per continentem aerem gignens plantas, animalcula, metalla et lapides; idque in aqua, in aere, et in terra ac sub terra, quae sane manet actus non contractus ad naturam individui per signatam materiam, sed unus specie actus rosae aut maluae gignitur, alius lumbrici. . . ."

[42] Aristotle *op. cit.*, 762b 10—15.

[43] Walter Pagel, *Paracelsus* (New York: S. Karger, 1958), pp. 117-118.

[44] Published in Valladolid.

[45] *Ibid.*, in the collected works (Frankfort: Palthenius, 1620), vol. III, p. 671, col. 2. ". . . huius facultatis seminaria plurima expandi per continentem aerem a coelo gignantia plantas et animalcula quaedam: tamen haec menent actus non contractus. . . ."

peculiarities designed to form a type of subject, not a particular member of a type or species.

Such a power, since it does not come through properties restricted to this or that matter, always produces something specifically similar to itself, but not individually similar, precisely because it is not limited and restricted by matter. But the formative power which is found in animate things, since it is restricted by matter, is hence able to produce something which is of the same species, but which is also similar with regard to certain definite dispositions and properties in the individual from which it came.

In animate matter, the specific features of an individual affect the seed, which then reproduces certain characteristics. The forming faculty itself does not change, but gives the seed the impress of these characters and through the medium of the seed, develops a new individual.

Since the formative faculty of the body is resident in the members of the parents and produces something similar to itself in their reproductive organs, it necessarily gives rise, not only to the substance, as well as to the perfection and form which constitute the species, but also the similarity in matter and bodily characteristics.[46]

B. *The Formation of the Seed.* The seed, said Mercado, is composed of humors which nature sends to the reproductive organs. The humors receive from the blood's " residuum " a potential similarity to all parts of the body. Mercado's notion of a residuum of the blood, or *sanguinis superabundans,* is reminiscent of Aristotle and others.[47] The idea that the residuum acquires a " potential similarity " answers the objection that if an actual model came from each part of the body, the seed would be a small animal alike in detail with the parent.[48]

Mercado refers to a part of the body—a hand or an organ—as a

[46] 435.II.A-B. ". . . qui cum non sit per proprietates certae materiae coercitus, producit semper sibi simile specie, non tamen simile huic vel illi individuo, quia non contrahitur et coercetur a signata materia. At formatrix quae in animatorum semine continetur, cum sit per signatam materiam contracta, ab illa recipit ut producat speciem similem, respondentem tamen certis definitisque affectibus et proprietatibus eius individui, unde decisa fuit. Caeterum cum sit vis corporis informatrix residua in parentum membris, et sui similitudinem in testibus inducat, necessario inducet non solum similitudinem structurae, et temperiei, ac modi substantiae idoneam, ad actus et ad formam, in qua species consistit, sed et materiae et qualitatum corporalium."

[47] 438.I.D. " Sanguinis (qui a membris inchoationem coeperat recipere) superabundans pars in quovis membro in testes delabitur, ea inchoatione et sigillo accepto a iecore et a membro, cuius alimenti est residuum, et ut ferunt, excrementum ut vere fiat seminis materia."

[48] 438.I.C. " Cui dubitationi dicendum est, nec decidere a toto corpore semen actu, nec prodire a iecore, priusquam aliquam omnium et cuiusque membri suscipiat similitudinis sigillationem aut inchoationem."

member, which is distinguished by 1) its shape, 2) its *temperamentum,* or balance of humors peculiar to the member, and 3) its property of substance, the function or attributes peculiar to a member.[49] A member is the basic unit of composition in the individual. From the members come "*simulacra*[50] called forth by the forming faculty" and present in the *inchoatio* of the blood.[51] The *inchoatio* in this way receives from a member the potentiality of temperament and of property of substance. Into it pass also the *habitus, spiritus,* and influences from the effective principle.[52] Composed of humors elicited from the entire body, the *inchoatio* or residuum of the blood forms the seed's material which determines the shape and also contributes to the property of substance of the future member. The forming faculty works on this material of the seed to produce certain humors which, in turn, form the fetus. These humors, specifically concerned with formation, determine the temperament of a member and share with the seed the responsibility for property of substance.[53] The functioning end results of the forming faculty's effect upon the seed are the actions, movements, and functions of a member. The following diagrams Mercado's scheme:

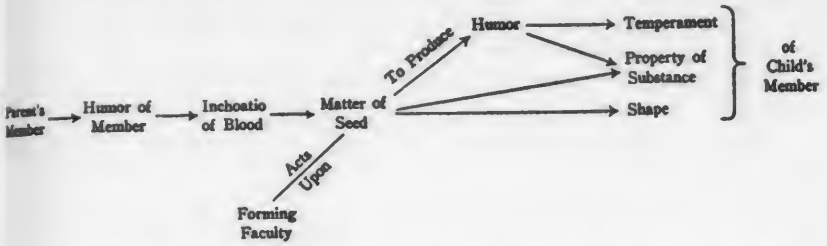
[49] Figura, temperamentum or temperies, and modus substantiae.

[50] 439.II.B. "Informatrix licet habeat omnium paternorum membrorum simulachra . . . ab omnibus illis excitatur ad opus."

[51] 438.I.D. "Citra eam potentiam et sigillationem seminis materia non erit: quo fit, ut temperiei et modi substantiae morbidi et sani inchoationem reciperet, qua deinceps in genito similis intemperiei et modi substantiae eluceat modus." *Inchoatio* can be defined as an amorphous substance which, for Mercado, contains within itself the power to take shape.

[52] 435.I.D. "Qua ratione genitum (semen) fuit particeps, non modo vitii, quod est in effectivo principio." 435.II.B. "Quam sane similitudinem fieri diximus ex temperie et spiritu a parentibus semini praestitis, quibus similis elucet in filio temperies, ac ex consequenti omnia quae temperiem sequuntur." The effective principle appears to be the same as the forming faculty, i. e. the activity which accomplishes bodily functions. 'Spirit' is more difficult to define. It cannot mean the soul, for Mercado believed along with all Catholics of his time, that the soul is a special creation by God at the time of fertilization. Its use does not seem to carry any more meaning than an infusion of characteristics of the parents. Compare Mercado with Aristotle, who says, ". . . that which causes (the semen) to be productive; I mean that which is called vital heat. This is not fire nor any such force, but it is the spiritus included in the semen and foamlike, and the natural element in the spiritus, being analogous to the element of the stars." (*op. cit.,* 736 34-737[a] 1.)

[53] 438.I.D. "Itaque figurae vitia, plerumque formatricis errato, ex impedimento materiae succrescere est arbitrandum: temperamentum morbosum, ab humore quo membrum efformatur, modi substantiae vitium ab utraque causa."



In addition to the *simulacra* which the seed receives from every member of a body, said Mercado, the seed is also sent a model (*idolum*) from the liver.[54] The synthesis Mercado here develops between several origins is similar to that made by Vincent of Beauvais (1190-1274) who wrote, "The explanation, then, harmonizing all these (theories) is that it descends principally from the liver (*epate*): originally from all the members, and especially from the brain." [55] Mercado is quite certain that the brain does not mediate the formation of the complete seed. He believes that this idea arose from ignorance of anatomy and lack of dissection.[56] Nothing from the mind—neither learning nor knowledge—is transmitted in the reproductive process.[57]

Reisch (1503) stated that the material of the seed comes "principally from the liver, although originally from all parts." [58] Jean Fernel (1564) denied a derivation *a toto corpore*, using Aristotle's objections cited above, and maintained that the heart and liver supply the semen.[59] Many writers have seen in the blood a source of the seed, in that blood is present in all members and provides nourishment for all parts. This nourishment

[54] 438.I.B. "Statuendum est . . . humorem quem natura in testes semini gignendo transmittit, ut possit fieri materia seminalis et altera pars illius principii nostrae generationis, ac induere formam seminis, nulla lege posse esse proficuum, nisi prius ex iecore sigillationem et idolum, seu inchoatum ac potentialem similitudinem omnium parentis membrorum susceptet."

[55] Vincentius Bellovacensis, *Speculum doctrinale*, vol. 251, bk. 32. chap. 11, 1.32 (Nuremberg: Anton Koberger, 16 March 1486).

[56] *De veritate et recta ratione principiorum ac theorematum et rerum omnium*, bk. I, pt. IV, class. I, Q. 96, p. 230.

[57] 436.I.E.-II.A. "Affectus potentiae superioris ad informatricem non transeunt, cum ab ea neque a suis habitibus secedat vis seminis informatrix. Quo fit, ut quae insunt sensitivae potentiae, vel phantasiae aut rationali, non transeant, ut pote sensationes, artes, scientiae: non enim haec traduci possunt, quia facultas animalis, cui insunt, solis animalibus propria, multo est supra gignentem etiam stirpibus communem."

[58] Gregorius Reisch, *Margarita philosophica* (Freiburg: Jos. Schotten, 1503), bk. IX, chap. 37.

[59] Jean Fernel, *Medicina*, (Lugduniis: Caesar Fari, 1564), bk. 4, chap. 12, p. 326.

for growth has been seen in itself as a sort of birth or generation. Because the liver was considered the origin of the blood, physicians ascribed a major role to it in the production of the seed. In Mercado's synthesis a duplication occurs in the functions of the *inchoatio* of blood arising from all the members and carrying their impress, and a second model or image from the liver.

C. *Influences upon the Seed.* Mercado admitted few influences from outside the body upon the seed. In 1579 he earnestly discussed the effects of seasons and phases of the moon on the fetus,[60] but in 1605 introduced them into his reasoning more as a rhetorical device than as a serious force. In *De morbis haereditariis,* the only reference to such effects states that

> some with one woman have begotten males, with another they have always begotten females, now healthy children, now diseased. This variety they explain equally by changes in the seasons and by the changing state of the moon, whether it is full or the opposite. But if these external causes have such an outstanding power to alter conceptions, one should not be astonished if internal causes are able to effect the same.[61]

An external event cannot create *de novo* an inheritable quality: "No external cause can furnish the principle of injured temperament or property of substance unless the same temperament or the same property of substance were conditioned in a member or the whole body." [62] We can understand this to imply that the environment may draw out of a member a quality or feature not previously evident, but that the external world cannot induce a temperament or property of substance foreign to or not latent within a member. Provided the temperament is only in the disposition, "although it may interfere with the actions, the process of generation and the individual formed will not be harmed . . . but if the injuries of the parent have been put into the nature . . . due to the material of the seed . . . it is clear that the begotten individual becomes in these conditions, temperament, and property of substance, most marked in that part in which the father was affected." [63] This passion to protect physiological processes from willy nilly effects of the environment and an insistence on orderly, rational explanations of even the most obscure occurrences are keys to Mercado's system of medical thought.

[60] "De monstroso conceptu," *De mulierium affectionibus,* bk. III, chap. 7.

[61] 439.I.E.

[62] 437.II.E.-438.I.A. "Temperamenti autem vitiati, vel modi substantiae nulla causa externa principium praestare potest, ni prius habitualis fiat in aliquo membro, vel in toto corpore eadem intemperies, vel idem substantiae modus."

[63] 438.I.A.-B.

D. *The Causes of Hereditary Disease.* Mercado defines hereditary disease as:

> . . . a quality, character, impression, property of substance, a certain relation or arrangement or emphasis beyond the normal, in one, many, or all parts of the person formed, so marked by its origin in the power of the seed of the parents, grandparents, or great-grandparents, from a similar prior affliction in their abnormal members; so that as if by an instrument or some other cause nature so orders the bringing forth of individuals similar to oneself and deformed by the same defect.[64]

Hereditary disease, like health, originated in the birth of an individual and develops from natural principles; the precipitous loss of health which characterizes common disease does not create it, declares Mercado.[65] Aristotle had similarly approached the problem, distinguishing hereditary disease from diseases arising through a post-natal cause.[66] The two classes of disease resemble each other, according to Mercado, only in that both harm the actions of the body.[67] The injury to the offspring may be present in any part of the body, e. g. an epileptic brain, or, as with syphilis, in the whole body.[68]

Mercado distinguished between "active" and "potential" diseases. Active diseases injure activities of the body; a potential disease has the power to harm actions, but does so only in a favorable environment.[69] One can inherit both types of disease, so that, for example, one can from birth be deaf (an active disease) and potentially have gout, which may never appear unless the proper interaction occurs with the environment.

Potential disease may be inherited in two ways. First, the parent may

[64] 434.II.D. ". . . qualitas, character, sigillatio, modus substantiae, proportio quaedam, aut dispositio, vel impressio praeter naturam in uno, pluribus, aut omnibus membris geniti impressa, a sui ortu ex vi seminis parentum, avorum, aut proavorum, a simili affectu in eorum aliquo membro aut membris praeter naturam quoque praeexistente: quo veluti instrumento natura, vel causa alia utitur, ut natos sibi similes gignat, et eadem labe foedatos."

[65] 435.I.A.-B.

[66] Aristotle, *op. cit.*, bk. 4, chap. iv, pp. 425-427.

[67] 435.I.B.

[68] 436.I.D.

[69] 436.II.B.-C. ". . . unum actu morbosum laedentemque proprias individui generantis et geniti actiones, ut videre est in manco . . . reliquum vero praeter naturam quoque et morbosum, caeterum non habentem laesas actiones actu, natura temen ipsas laedere potentem. Exemplo est pater insalubri apparatu ad podagram, vel ad quemvis alium morbum affectus, non tamen podagra, actu laborans, qui profecto generabit liberos eodem apparatu affectos, quos etiam affectio eadem actu vexabit, quavis causa accedente, ex indispositione et potentia ad ipsam in membris a patre praestita: quia licet sani videantur vivere, levissimis tamen de causis in podagram incidunt ex habitu podagrico a nativitate contracto, aut aetate adveniente seniori, qua vires, quibus habitui illi resistebat, imbecilliores fiunt, aut si ex diutino morbo prave ac diminute convalescat, reficiaturve."

impress a tendency toward the disease into which the environment might then force the child. This development can be hindered by humors which may arise and weaken the impression, returning the body to a healthy state. Then again, the manifest disease may produce another affliction which obscures the original. The second manner in which potential diseases may be transmitted involves the seed of the other parent. If the seed of the spouse hinders the impression of the other parent's defect, no active ailment will develop but the defect is nevertheless present latently.[70] This hidden defect can be inherited like any character; when in reproduction there chances to be no contrary seed in the other parent, an active disease occurs in the offispring.[71]

Mercado maintained that the seeds of both parents influence the genetic make-up of the child. In this opinion he agreed with Lucretius, Hippocrates, and Albertus Magnus, and seemingly contradicted Aristotle's books.[72] In addition to the seed of both parents, Mercado includes as influences the mother's blood [73] and the diseases of the parents when conception occurs. When a part is affected, it first weakens and becomes unstable; then an abundance of excrement besets the member, asserts Mercado,[74] who may be influenced by Aristotle's description:

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[70] 438.II.C.-D. ". . . uno, quia pater non imprimit in filium nisi characterem, vel sigillationem, dispositionem seu apparatum illum morbosum, quo filius facile causis accedentibus incidit, ob praedictum apparatum, seu habitum, in consimilem morbum, licet ipse natus fuerit sine actuali morbo, quantumvis cum illo apparatu ad ipsam nascatur." 438.II.E.-439.I.A. "Secundum quod solet actum sigillationis vel praepedire, licet imprimatur potentialiter, vel in actum morbosae actionis individualis prorumpere . . . est vis et efficacia seminis aut sanguinis materni, in quibus nil mali adest: quam vim aliquando contingit adeo praevalere, et paterni seminis vitia superare, quod nequeat character actuali vitio imprimi, et ob id in filio nil mali eluceat."

[71] 439.I.A. "Verum si filius uxorem ducat, cuius sanguis et semen non sint tantae efficaciae, mirum non est, si in nepotibus eluceat avi haereditarium vitium."

[72] That both parents produce a seed seems directly contrary to the statements of Aristotle, but Mercado interprets otherwise. By an analysis which is rather detailed, he concludes that Aristotle believes the mother does contribute a seed which is somewhat less active than the seed of the father. The primary foundation for this deduction is the metaphysical doctrine that causes are in a way causes of themselves. ("Causae quaedam sunt sibi invicem causae." For a discussion of this *see* Nuntrio Signoreillo, *Lexicon peripateticum philosophico-theologicum*, Rome: F. Pustete, 1931, p. 83). That is, the material cause of the child (the mother) is also in a way the formal cause (which Aristotle said was the father) in that the state of the matter determines the form which can be sustained. This digression of Mercado's is not the basis for any of his later conclusions and is probably inserted to placate those who thought Aristotle to be the supreme authority on this subject.

[73] Cf. Avicenna (*op. cit.*), fen. 3, cap. 1, l. 1, "Generationis nostrorum corporum principium primum res duae fuerunt, quarum una est sperma viri . . . et altera est sperma mulieris, et sanguis menstruus. . . ."

[74] 437.I.B.-D.

The abnormal parts generally are attached near those they resemble, but sometimes at a distance, because of the movement taking place in the embryo and especially because of the excess of material returning to that place where it was taken away while retaining the form of that part where it was a superfluity.[75]

The defects, just as any feature of the body, are characterized by their shape, temperament, and property of substance.

This change from the healthy may be brought about by forces outside the individual or by those operating internally. As we have observed before, Mercado felt compelled to fit into his theory Hippocrates' observations of the Macrocephaloi. Perhaps he wanted to make a general provision for interaction between the environment and the biological organism. Probably to account for a causal relationship between external forces and heredity, Mercado states that when the environment causes a part to work obstructedly and to lose its proper shape and disposition, this obstruction may cause a change in the nature of the person and in the hereditary make-up of later generations.[76] Mercado does, then, provide for the transmission of acquired characters, but he does not put the matter so baldly; transmission is rare and occurs only after certain biological requirements have been fulfilled. The story of the Macrocephaloi described how a defect passed from the status of a custom to its incorporation into the habit and finally into the nature.[77] The suggestion that an ill-working part may eventually be eliminated from transmission and another, better suited, member take its place is quite similar to the views promulgated by the theorists of the eighteenth and nineteenth centuries.

Often defects of shape are the most remarkable signs of hereditary affliction and may result from an injury to the forming faculty, a defect in the material of the seed, or inadequacy of the material upon which the seed works.[78] A defect in the material of the seed may be remedied by the seed of the spouse, our author relates.[79] Sir Kenelm Digby later advanced the same grounds for correction of error in a parent's seed.

[75] Aristotle, *De generatione animalium*, trans. Arthur Platt (Oxford: University Press, 1912). 772b 22-26.

[76] 437.II.B. "Quo fit, ut si ex ictu, casu, percussione aut quavis alia causa extrinsecus aut intrinsecus violenter et subito accedente, particula aliqua propriam amittat figuram, quia dolorose et moleste operatur, nusquam habitus acquiritur, ac ex consequenti natura non inclinatur ad actiones nisi coacta." *See also* 437.II.C. "Solent etiam huiusmodi figurae vitia contrahi. . . ."

[77] 437.II.A.

[78] 437.II.C. "Solent etiam huiusmodi figurae vitia contrahi non casu verso in naturam ut dictum est, sed vitio formatricis facultatis, quam interdixit probe munus suum exequi, vel materia in qua est, quae est pars naturae seminis, vel ea circa quam operatur."

[79] 437.II.D.

And the effect proceeding from the seed, that is, the young animall will come into the world savouring of that origine; unless the mothers seed do supply of temper what the fathers was defective or superabundant in; or contrariwise the fathers do correct the errours of the mothers. (1645)[80]

Defects of the placenta or syphilis exemplify injuries which may produce general ills from birth but are not themselves hereditary, because the sufferer does not reproduce their character.[81] In exception to this, Mercado recognized a hereditary form of syphilis. Generally, however, syphilis was of a contagious variety which produced a disease-inducing humor.[82]

A disease, once placed in the seed, may actively continue for three or four generations; it is, in fact, never wholly absent, and in the future it may bloom again.[83] We have quoted Mercado on seasons and phases of the moon and have found little to suggest that he actually believed they could influence inherited features. The material of the mother, on the other hand, can restore a member to health in her children.

Mercado noted that a particular disease may occur in varying degrees of severity. Several causes of this gradation are suggested: the forming faculty may not call forth simulacra equally at all times; the poorly defined " power to reproduce similarities " may be impeded; the healthy character in the seed of the spouse may partially overpower the specific error; the material on which the forming power must act may be deficient, or perhaps the imagination disturbs the image of the forming power and forces itself to be impressed.[84] Mercado minimizes the latter possibility, turning away as he did from a current emphasis on the effects of the imagination and the mind on heredity.[85] From earliest time a common belief held that the imagination could upset the process of reproduction. We meet the notion in Aristotle[86] and again in Paracelsus.[87] Cardan in 1550 related the

[80] Sir Kenelm Digby, *Two Treatises* (London: John Williams, 1645), chap. 24, § 8, p. 277.

[81] 437.II.D.-E. " Sed licet hae affectiones quae ex humoribus pendent, haereditariae debeant haberi, non tamen legitime haereditariae sunt, sed spuriae, quia in filio non imprimitur patris character, sed vitiosus humor, qui similes morbos et aliquando diversos parit, non tamen a simili charactere, sed a simili humore, ut filius morbo Gallico affectus, ob humores Gallicos. . . . "

[82] 439.I.C.-439.II.D.

[83] 438.II.E.-439.I.A.

[84] 439.II.C.-D. With respect to "inadequate material" (*materia inepta*), cf. *De mulierium affectionibus*, 393 C.

[85] Cf. Fernel, and Mercado's earlier work *De mulierium affectionibus*.

[86] Aristotle, *op. cit.*

[87] Pagel, *Paracelsus*, pp. 121-125.

hereditary transmission of training in dogs,[88] the possibility of which Mercado emphatically denies.

The passing of generations from the person who first bore the disease diminished the likelihood of receiving the full force of the ailment.[89] In accord with Lucretius, our author holds that the members of past generations are contained in the seed and are sorted out in reproduction. Mercado's sorting was a distribution of specific characters *in concreto,* although also potentially.[90] This position differs from Aristotle's which viewed influences from past generations as the result of a contest between the essences or acts from the ancestors.

> In generation both the individual and class are operative, but the individual is the more so of the two, for this is the only true existence. . . . Therefore it is from the forces of all such existences that the efficient movements come which exist in the semen; potentially from remoter ancestors but in a higher degree and more nearly from the individual (and by the individual I mean e.g. Coriscus or Socrates).[91]

Mercado saw only the overall force behind reproduction as immaterial; the characters were materials composed of humors. His ideas, then, show the way toward a more particulate and more tangible representation of hereditary transmission.

E. *The Cure of Hereditary Disease.* When Mercado stressed the immutability of hereditary traits, he left little expectation of cure. In discussions of treatment he remained consistently pessimistic and relied primarily on relief of symptoms. He distinguished, however, between the contraction of a disease *in utero,* which he thought was curable, and the genetic inheritance of a similar disease, which was not curable.[92] Impossible to cure was disease which one had potentially, but without visible signs.[93] One hope, however, was extended to those with hereditary defects or who had the chance of eventually getting them—his belief that a trait was not indelibly impressed until adulthood. Therefore, purges and the customary treatments might eradicate impressions in one's early, plastic period of life.[94] Mercado admitted that this was not very successful,

[88] Jerome Cardan, *De rerum varietatis,* bk. VII, chap. 37 (1550), cited by Zirkle, *op. cit.* p. 98.

[89] 442.I.A., and 439.II.C.

[90] 439.II.C.-D. ". . . in semine non solum continetur imago oculi, verbi gratia paterni, sed et oculi aut cerebi avi aut proavi: nisi quod quo longius procedit, vetustate obscuratur et delitescit imago. Quo fit, ut quidam ex natis morbos et vitia parentum, alii avi, alii proavi contrahant, mediis generationibus (ut dictum est) eisdem carentibus."

[91] Aristotle, *op. cit.,* 767^{b}-768^{a}.

[92] 440.I.E.

[93] 440.II.A.-B.

[94] 441.II.B.-C.; 436.II.C.-D.

but emphasized that if the commonly accepted theories of heredity were true, a reasonable procedure of eradication should be possible in childhood. In youth, the balance of humors is alterable, for the humidity of the tissues increases their pliability in treatment. As age advances, a person dries out; the balance of humors and the actual disease become permanent.[95] Although this theoretical formulation did not invariably work in practice, it did spare many adults from useless medical and surgical procedures being used to erase inheritable defects.[96]

In Mercado's reasoning, three arguments prove that hereditary diseases are not treatable. The first, couched in scholastic terminology, maintains that matter and form complete the human composite, and therefore defects of matter are intrinsic and cannot be eliminated. Now, defects of matter are the causes of disease, not the form which is the disease. That is, defects of matter cause the form to work defectively. Diseases which are transmitted by parents with the seed (hereditary) change the composite through disorder of matter, which wrongly disposes the form. In this way hereditary disease is natural and cannot be remedied.[97]

The second reasoning is *a fortiori.* Hereditary disease originates in a disposition of the native constitution; it is not brought about through custom. But when we examine dispositions in ourselves, e. g. drunkenness, acquired through custom, we see that they pass into the nature and are removed with the greatest difficulty. We can assume, then, that a disposition acquired from the principles of generation could hardly be removed at all.[98]

The last proposition divides the activities of medicine into those supplying deficiency, and the others removing excesses. Evacuations are useful to remove excess food which the infant may have ingested after birth,

[95] *Ibid*

[96] 442.I.C.-D. "Quo evidenter constat, eos turpiter errare, qui parentes aetate iam provectos (praecautionis gratia, ne filios generent propria labe foedatos) vacuationibus, sudoribus, balneis, aut aliis praesidiis inutiliter conterunt."

[97] 440.I.A.-B. "Ut materia est altera pars compositi, et eius naturam complens, ita vitia materiae erunt adeo naturalia et intranea, quod sicut citra subiecti corruptionem materia separari non potest, ita nec eius vitia emendari (et cum hoc vitia materiae non constituunt rationem morbi, sed causae: quare formae, cui morbi tribuuntur, vitia, morbi sunt, quod materia male dispositae cohaereat, et ob id prave operetur) sed morbi haereditarii, quos cum materia seminali scimus a parentibus transmitti, ob vitium materiae pullulant in toto composito: ergo hac ratione corrigi nulla lege possunt: et minor probatur, quia facultas seminis, quae se habet veluti ipsius forma, adhaeret huic seminali materiae, quae dum prave est sigillata a parentibus, prave etiam disponit facultatem, adeo ut affectos quoque generet filios: sed talis affectio naturalis est, et ex naturalibus principiis orta: ergo minime corrigibilis."

[98] 440.I.B.

but experience shows that purges cannot remove an excess of liver or some other innate quality. Moreover, augmentation cannot supply absent parts, argues Mercado.[99] This last analysis states simply that treatments attempted so far have not been effective.

Mercado concluded from these propositions that "of hereditary diseases some are altogether incurable; some admit of total cure; some can be cured in the child, but not in the progenitor; and finally, some, although they cannot be cured in the child, can be so dealt with in the progenitor that they are not transferred to the children." [100] Hereditary diseases, then fall into four classes:

1. Potential diseases which are beyond the treatment of physicians, especially since "they are almost all present in the solid and chief parts." [101]

2. Diseases which are curable, but with great difficulty, e. g. syphilis.[102] Two classes of syphilitic affliction exist. One is that which is resident in the liver, i. e. in the genetic make-up of the child: "such sons are cured for a time, but after a while they fall into one or another of the afflictions of syphilis." [103] The second class is the accidental touch of syphilis contractable *in utero,* or from a nurse or the mother after birth. This type may be cured in the uterus by the good nutrients which the fetus receives there, since "it is very certain that the fetus within the uterus takes hold of the food from the purer part of the maternal blood . . . we see that weak and diseased mothers produce very handsome children with a healthy disposition." [104] Also, in the latter instance, shifting of

[99] 440.I.B.-C. "Tertio ratio se habet in hunc modum: Medica facultas solum docet demere quod superabundat, et quod deest addere: sed nullo horum modorum morbus haereditarius curari potest: ergo. Minor probatur: Non evacuatione, quia ea quae praeter naturam abundant post generationem, eo quod ex alimentosa materia fiant, vacuatione auferuntur: quae vero naturalia in nobis insunt, ut morbi haereditarii, nequaquam. Quippe contractus habitus nulla lege evacuatione demendus est. Item non curantur additamenta quia id non fiet nisi per generationem: in genitis id fieri est impossibile, ergo nec morbi haereditarii curari poterunt."

[100] 440.I.D.

[101] 440.I.E. ". . . quales sunt fere omnes qui in membris principalibus et solidis partibus praesunt . . . huiusmodi haereditariam affectionem non magis posse curari, quam naturalem affectum. . . ."

[102] 440.II.A.-B.

[103] 440.II.A. ". . . tales filii ad tempus curantur: caeterum paulo post iterum relabuntur in unam aut alteram ex Gallicis affectionibus."

[104] 440.II.B. "Praesertim cum certissimum sit, foetum intra uterum ex puriosi sanguinis materni parte alimentum capessere . . . conspicimus, valetudinariam et morbosam matrem filios producere pulcherrimos, et boni habitus."

humors within the body allows a cure by evacuation and augmentation to be efficacious, although difficult.

3. Diseases which "are incurable as far as the impressed character is concerned, whether you wish to cure the father or the child." This category includes most diseases. But in this case sometimes "diseases which arise from these vitiated humors are curable." [105] Here Mercado gives wide and varied examples: gout, ophthalmia, syphilis, the itch, and elephantiasis. "If a father should give to his child a hot liver producing a great amount of bile, or a cold stomach producing indigestion, we will be able to cure the disease arising from these waste products and excess blood by bleeding and applying cleansing preparations." [106]

4. The last category admits of cure and elimination of the innate character, but treatment is limited to childhood.[107] Here the implements of medicine are most effective and the hope for cure the greatest. In this discussion Mercado carries the traditional concepts of medical care to their ultimate conclusion. He urges that if these theories are true, there should be little difficulty in the cure of hereditary defects. His description of treatment draws attention to the fundamental errors in the venerable medical beliefs.

> If indeed for this reason the art of medicine instructs that a defective nature changes into a better and more healthy one, it will also teach that hereditary affliction and an unhealthy manner and temper of substance may change . . . just as the former is not impossible, so the latter is also not impossible . . . hereditary afflictions, at least those which are in an active state, are not completely incurable.[108]

Mercado maintained that if the imagination of the mother or father is able to alter the child at the time of conception, so the art of medicine ought to be able, by the cultivation of the imagination, to avert these hereditary marks. Moreover, if monstrous beings are produced by change and alteration in the natural temperament, substance, and shape of the

[105] 440.II.C. "Incurabiles quidem sunt, quatenus pertinet ad impressum characterem, sive in patre velis curare, sive in filio . . . morbi vero qui ab his humoribus vitiatis oriuntur, curabiles sunt. . . ."

[106] 440.II.D. "Nam si cui filio pater praestiterit iecur calidum copiosam bilem generans, aut ventriculum frigidum cruditates efficientem, morbos ab his recrementis et ubertate sanguinis obortos, curabimus proculdubio. . . ."

[107] 441.I.D.-E.

[108] 440.II.E. "Siquidem qua ratione naturam lapsam in meliorem et salubriorem mutare dodocet ars medica, docebit etiam haereditarios affectus, et insalubrem substantiae modum ac temperiem . . . ergo sicut illud impossibile non existit, ita neque hoc . . . haereditarii affectus, saltem qui actu existunt, incurabiles omnino non sunt."

parent, in the same way it may be removed. "It is not more difficult to carry away the diseased and hereditary disposition, so that the fetus becomes healthy, than to carry off and change the natural disposition, so that the fetus becomes a monster." [109]

Finally, "there are many causes by which children are made dissimilar to their parents in those features which are natural and individual, therefore there are other causes which are able to produce a child dissimilar from defective parents." Mercado continues, "a physician, *imitator naturae,* is with the instruments of the art able to supply the natural causes." [110]

From these proofs we gain assurance of the likelihood of cure, but Mercado still advises caution: "This conclusion is correct: a hereditary character or diseased mark can be cured in no way or by any art when it does not actively work badly, and especially is this true if the individual has passed adolescence by." [111] Our author quotes Plutarch, Avicenna, and Hippocrates to the effect that successful treatment is limited to the years of youth.[112]

F. *Treatment of Hereditary Disease.* In review, hereditary disease should receive treatment in youth when the defects can be cured or impeded. In this period the body is less solid and dry; change is more likely now through the agency of foods which may cover the defect or convert it into a better property of substance. Physicians, hoping to evacuate the hereditary defect, usually treat patients with drugs to remove excess humors. This procedure is wrong, asserts Mercado, having tested it experimentally.[113] The error begins with the incorrect assumption that the trait is an excess humor like illness; rather, it is natural, so that an excess of humor impedes a hereditary deformity and the removal of the humor allows the defect to work more freely. Correct treatment is conservative. It consists of restoration (*nutritio*) and development (*adgeneratio*).[114] By this, Mercado apparently means a correct diet and

[109] 441.I.B. ". . . non est maior difficultas in auferendo morbosum, et haereditarium habitum, ut foetus evadat sanus, quam auferendi, et mutandi habitum naturalem, ut foetus evadat monstrosus."

[110] 441.I.C.

[111] 441.I.D. "His suppositis, statuendum etiam est, ut nulla subsit in conclusione dubitandi ratio, haereditarium characterem, seu morbidam sigillationem (ubi actu, et manifeste particula aliqua non laboret) curari nulla ratione, neque arte posse, idque maxime si adolescentiam praeterierit homo. . . ."

[112] 441.I.D.-E.

[113] 441.II.D. ". . . experimento fidissimo non semel probavimus. . . ."

[114] 441.II.E.-442.I.A.

regimen which will promote good development. Since passing of time may eliminate the defect, patience is advised. Drugs or evacuations are recommended if alien juices hinder the progress toward health.

Care of the character itself may weaken the defect and make it more susceptible to treatment by other processes, but the method of treatment available, in Mercado's opinion, will not cure it.[115] It is especially important that persons with the same defects not marry. One should seek a spouse different from oneself in as many individual characteristics as possible. Contained in this advice is the notion that characters may be individually inherited, and an assertion that the chance for a child to inherit a defect present in both parents is much greater than if it is present in only one parent. The healthy spouse may counteract the bad seed of the potentially defective spouse.[116]

For the child who may develop hereditary disease, Mercado advises that we must treat the child's part which in the parent is defective. A proper diet is the treatment. This conservative method effects a loosening of the innate substance and therefore a dissolution of the defect. Parents may also be treated so that they may not pass on the ailment. This eradication is difficult with medicine, but a complete change of life and diet ought to result in changed blood and, consequently, in healthy seed.[117] Darwin later employed the same reasoning for tree grafting. The grafts were intended to change the gemmules of the tree and to produce hybrids from the seeds.[118] Mercado wanted to change the human seed by a method deduced from his theory of hereditary disease. So far, neither suggestion has borne fruit.

A child in active disease presents additional problems. Treatment is usually not successful, even when the child is worked upon with purges and a strict regimen of life and nutrition. Besides this, the program includes medicines used as though the defect were one acquired accidental-

[115] 442.I.D. ". . . fiet necessario per veram curationem, non curatoriam, sed quae contrarietate quadam vim habeat, et potestatem infirmandi sibi conjunctum."

[116] 442.I.D.-E. "In qua re id primum observatione dignum iudicavi, ne vitium parentum in omnem posteritatem firmiter transeat: quod nunquam connubio jungi debent duo parentes ex eadem vitiata familia descendentes, quippe tunc facile, et longe immedicabilius malum in filios trahetur, quod utrumque semen eadem labe infectum sit. Quapropter consultissimum est, ut sigillatio paulatim extinguatur, et delitescat, viros uxorem ducere alterius familiae, ut foeminas nubere aliis viris." *Also* 442.II.E. ". . . ad praecavendam seminis labem necessum esse, uxorem, aut virum quaerere, qui temperie, modo substantiae, et fere in omnibus individualibus conditionibus dissideat longis intervallis ab uxore. . . ."

[117] 443.I.C.-443.II.A.

[118] Darwin, *op. cit.*, vol. 2, pp. 348-349.

ly. Lastly, Mercado is impressed by the rehabilitation which artificial aids can supply.

> If the diseased one is deaf, in addition to the medicine, open his ear canal with shouting and an ear trumpet. And, afterwards, let us in some secluded spot teach the deaf and dumb to speak by forming and articulating the voice. By long practice many with hereditary affliction have regained their speech and hearing, at least as needed in ordinary life.[119]

4. Mercado's Achievement

Mercado reported no factual discoveries and described no unique events; what he reveals is an attitude which views heredity and hereditary disease as subject to rational and palpable investigation. Although the title of his work implies that some treatment will be suggested, the treatise itself is much more analytic than therapeutic. He acknowledged the great difficulties in treating hereditary diseases; to those afflicted he offered little hope, certainly no miraculous or simple cures. He proposed such aid as speech training to overcome handicaps, an attempt to control the environment to forestall a tendency toward a disease such as gout from actualization, and some regimen and purges in youth to prevent development of a trait. To the latter he adds the qualification, " but do not follow this course to the extent that a patient gets another disease from the treatment." [120]

The characteristic assumption one notices in *De morbis haereditariis* is that certain material causes (i. e. the seed, environment, and the genetic make-up of the parents) do affect the child, whereas the imagination of the parents at conception or during pregnancy, the seasons, phases of the moon, and the direction of the wind do not affect him. This attitude flows from his personal view of medicine and physiology rather than from any data and experimental conclusions introduced into the book. Mercado, moreover, had not always held such " modern " views, for his treatise *Concerning the Afflictions of Women* (1579) contains long digressions on the influences of imagination, seasons, and the moon's phases.[121]

Once Mercado envisaged the reproductive process occurring without haphazard effects of such forces as the weather, he was then able to reach

[119] 443.II.B.-C. " Quippe si surdus sit laborans, praeter auxilia quae surditati prosunt, vociferationibus, aut tube sonitu aurium meatus aperire oportebit: et postea formatis, et articulatis vocibus in recondito, et obscuro loco oportebit docere surdum, et mutum loqui: nam diu in hoc labore perstando, multi hoc onere haereditario oppressi, visi sunt recuperasse auditum, et loquelam, quantum par est ad humanum consortium exercendum."

[120] 443.II.A.

[121] *Op. cit.*, p. 675.

certain conclusions in advance of his contemporaries. He recognized the continuity of genetic material from one generation to the next, and saw that this process was self-contained and self-sufficient to propogate without any " ghost in the machine." Undoubtedly from observation of individual cases, Mercado believed that both parents emitted a seed. His hedge that the mother's seed was somewhat less active than the father's seems a nod to prejudices in his time rather than a deliberate retraction of the principle.

By 1605, Mercado was expounding the idea that the specific characters which developed in the child were represented by individual factors. Defect in one parent's factor determining epilepsy, for example, could be outweighed by the healthy factor in the other parent. Going farther, Mercado reasoned that if genetic material had a continunity and if individual factors were capable of health or defect, then a defective character could be inherited but suppressed in those generations in which the other parent's seed was more forceful and prevented the expression of defect. This thought contains a remarkable similarity to the much later hypotheses of dominant and recessive genes. Mercado's distinction between the appearance of an individual (his " phenotype ") and his total genetic inheritance, part of which is not expressed but is transmissible (the " genotype ") is a powerful theoretical structure upon which to investigate genetic mechanisms.[122]

Mercado also noted that a particular disease might appear at random in a family and that, when it did appear, the degree to which it was expressed might vary. Today, variable expressivity is as intriguing a problem as Mercado found it.

Separate from the ideas of " dominance " and " recessivity " is Mercado's account of actual and potential diseases. Here he discusses interplay with the environment, not to explain inheritance of acquired characters as did the writers of the past, but to show how the surroundings can elicit a trait already present latently. An example of this, and a disease which has occurred and been recorded in medical literature for over two thousand years, is favism. The affected individual is quite well until he ingests fava beans; then massive hemolytic anemia occurs because of the absence of an hereditary enzyme. It is difficult to find a better example of how the environment can bring out a defect. Excepting the most clear-

[122] Compare with Maupertuis: Bentley Glass, " Maupertuis, pioneer of genetics and evolution," in, *Forerunners of Darwin: 1745-1859* (Baltimore: Johns Hopkins Press, 1959), eds. Bentley Glass, Owsei Temkin & William Straus, Jr., pp. 51-83.

cut hereditary diseases, all hereditary defects have an element of environmental response.

The author of *De morbis haereditariis* did not completely reject the inheritance of acquired characters; he described a system by which the environment could interact and affect the hereditary material. The formula stated that a custom (*consuetudo*), after long practice, became a habit (*habitus*); finally, by a means not specified, it entered the nature (*natura*) of the person. The nature is the very core of an individual, being that which makes him a man rather than a member of some other species. Mercado did not concern himself with detailing how something in the environment could interact with the nature, but instead he stressed the infrequency of this event and the difficulty with which the task could be accomplished.

> External or internal causes are able to effect the diseased temperament, and provided the diseased temperament is in habit (*habitus*), although it may interfere with the activities, the process of generation and the individual formed will not be harmed; and, as a result, children are born healthy and vigorous to strong and weak parents alike.[128]

When Mercado writes of how a part works badly because of the hindrance of the environment and finally of how the rearrangement which suits the environment is passed on to the following generations, we are strongly reminded of Lamarck and Lamarckism. The significance, however, is that Mercado had developed a way of looking at physiological activities which was later to succeed when the tools for exploration were at hand.

We can summarize Mercado's principal ideas. Both parents affect heredity: each parent provides a set of individual factors, the more potent of which determines the appearance of the offspring although both contribute equally to the inheritable genetic make-up. Throughout life, the environment interacts with an individual, not to change his hereditary component, but to draw out or conceal many traits. Finally, and perhaps most important of all, those suffering from hereditary disease should not suspect supernatural punishment, nor should the parents feel guilty. Hereditary affliction is as natural and ethically neutral as health itself.

[128] 438.I.A.

NOTES ON CARL VON ROKITANSKY'S AUTOBIOGRAHY AND INAUGURAL ADDRESS

PAUL KLEMPERER*

The edition of Rokitansky's Autobiography and Inaugural Address prepared by the distinguished Viennese historian Erna Lesky,[1] acquaints us with the personality of the great pathologic anatomist who was the architect of the restoration of the great medical school of Vienna in the 19th century. The autobiography has previously been published only in fragments; the inaugural address has not yet been available. Their perusal gives an insight into the development of one of the most important investigators and teachers of this discipline.

The description which Rokitansky gives of medical education in Prague and Vienna shows the low level of instruction at that time. It was determined by the rule of a bureaucracy which mistrusted talent and aimed at developing a safe mediocrity. The professors were uninspired drill-masters of their disciplines. Even the great Purkinje, who was in charge of anatomic exercises, failed, because he was not interested in teaching. What a contrast with Virchow's preparation guided by a Johannes Müller and a Froriep! It is the more remarkable that Rokitansky could rise to such heights. He was a self-made man; even in his chosen field he did not profit much from his superior, Johann Wagner, whose assistant he was from 1828 to 1832. It is enlightening to read what he says about Wagner, because it focuses upon the impasse in which pathologic anatomy found itself at that period and out of which it was led by Rokitansky and Virchow. He states that Wagner never grew beyond a casuistic pursuit of pathologic anatomy and " never realized the reformatory mission of his discipline." Johannes Müller characterized in almost identical words the inadequacy of contemporary pathologic anatomy. But Rokitansky found other masters to instruct him, and he specifically mentions the works of Andral, Hope, and Lobstein. It is interesting that he refers to the first and

* From The Mount Sinai Hospital, New York. Aided by a grant of the Dr. Eli Moschcowitz Fund.

[1] *Carl von Rokitansky. Selbstbiographie und Antrittsrede.* Eingeleitet, herausgegeben und mit Erläuterungen versehen von Erna Lesky. Vienna: Hermann Böhlaus Nachf., 1960.

last because their ideas might have influenced him in conceiving his Krasis doctrine. Andral already in his Précis of Pathologic Anatomy in 1829 points to the significance of the blood upon which he elaborates years later in his Essay on Hemato-Pathology. Lobstein, however, might have led him away from single-minded organicism, because he recommended that pathologic anatomy should concern itself not only with the organ changes which are immediately responsible for disturbed function but should also explain clinical symptoms reflecting affections of the vital force. Obviously, these could not be localized in single organs and tissues. That Lobstein's question intrigued him can only be surmised. But one might find support for this supposition in Rokitansky's reference to " assumed dynamic processes which have an anatomic element in a material alteration of the blood," which, however, can only be the subject of chemical investigation. (*Handbuch*, vol. 1, p. 5.)

When Rokitansky was appointed Extraordinary Professor of Pathologic Anatomy in 1834, he had gained the orientation for his life work, and he gives its principles in this autobiography and in his Inaugural Address ten years later. His ideas have become the tenets of modern pathologic anatomy and may sound trite to the sophisticated tyro of our discipline. But since Clark Maxwell says, " Science is best assimilated in the nascent state," some of them might be quoted here. Of the aims of pathologic anatomy he singles out the task of arranging the facts according to an anatomic view and of accounting for their adequate separation and collection in individual chapters of a general pathologic anatomy. The second task is to demonstrate that, and how, the data can be utilized for diagnosis in the living, since a progressive nosology cannot forego an anatomic foundation. In his introductory lecture he points out that pathologic anatomy ought to give the history of a process, the picture of the progress of the disease in the material substratum. Rokitansky's autobiography and inaugural lecture are not easy reading but they are a rewarding experience. It is amazing that he does not mention his Krasis doctrine and Virchow's famous critique.

Dr. Lesky deserves our deep appreciation for having made available these sources of the history of pathologic anatomy. But beyond that, her introduction and exhaustive notes reflect her usual profound comprehension of the medico-historic problems of the past in relation to the present.[2]

[2] After I had submitted this review to the *Bulletin of the History of Medicine* the Editor asked me whether I would not want to expand upon my brief remarks. I am grateful to Dr. Temkin for his invitation because it gives me the opportunity to reflect on the relevance of Rokitansky and his work to present day pathology.

In an address in 1845, Virchow [3] proclaimed that the real heritage of great men consists in their fruitful ideas, and he demanded that living generations should give an account of how they have utilized their patrimony. For many a pathologist of today Rokitansky might appear as an almost legendary figure reminiscent of a period referred to euphemistically as classical but appraised as outmoded in terms of modern pathology. The inaugural address and autobiography allow the modern reader to contemplate the question of whether the ideas for which Rokitansky stood have outlived their usefulness, whether they are to be merely taken for granted without much reflection, or whether they cannot still provoke some thoughts pertinent to the advance of medicine and particularly of its teaching.

The introductory words to his audience in 1844 refer to the governmental decision by which pathologic anatomy became an obligatory discipline of the medical curriculum. It might be startling to learn that this recognition had come so late in view of the almost century-old pathologic-anatomic tradition of Vienna. It was the incentive of these interests which had led in 1794 to the establishment of an institute and a museum for the pursuit of morbid anatomy in the General Hospital of Vienna. Rokitansky proudly pointed out that these installations had not been called into life because of the recent demands of a newly arising medical doctrine, but that conversely the institutions had given this orientation to the time. And thus one can understand his maintaining that his "student's conviction of the indispensability of the study of pathologic anatomy can be taken for granted" (p. 77). But it might be appropriate to ask whether the reasons he proposes are still valid today. His reliance on historical necessity, "an emergence from insignificant roots, a decline and a solid restoration upon the ruins which augurs well that it will never perish," (p. 79), might encourage those of us who are convinced of the eternal values of pathologic anatomy, but it does not provide them with persuasive arguments. What was the situation in Vienna in 1844 which should "convince everybody of the unimaginably wide scope of pathologic anatomy and its significance"? (p. 79). It was first "the wealth of material which distinguished the Institute" (p. 79). Wunderlich,[4] an enthusiastic visitor in 1840, wrote: "The Vienna Institute no more counts the

[3] R. Virchow, "Ueber das Beduerfnis und die Richtigkeit einer Medizin vom mechanischen Standpunkt." Rede gehalten zur Feier von Göreke's Geburtstag am 3. Mai, 1845 in dem med.-chir. Friedrich- Wilhelms Institut zu Berlin. *Virchows Arch. f. path. Anat.*, 1907, *188*: 1-27.

[4] C. A. Wunderlich, *Wien und Paris*. Stuttgart: Ebner & Seubert, 1841.

number of autopsies in the hundreds, and Rokitansky can consult thousands of protocols in reference to more than one disease. I do not believe that any other institute can match this proportion." An equal opportunity was provided by the " existing centralizing organization, i. e., the appointment of a director and of his assistants who can devote themselves entirely to the discipline " (p. 80). The concentration of all the autopsies in the hands of responsible prosectors contrasted with the practice in other medical centers of Europe, where necropsies were performed by the attending clinicians " wtihout a guiding and critical supervision of a man steeped in pathologic anatomy " (p. 78). It was the competence of the prosector which was fundamental. Rokitansky did not have to create an institution favorable for the development of pathologic anatomy as the leading discipline of medicine; it had been prepared by Van Swieten, de Haen, and Maximilian Stoll in the preceding century and was supported by the authority of the state which legalized the performance of autopsies. It had been advanced by the foresight of Johann Peter Frank, who succeeded in 1796, with the appointment of Alois Vetter as Prosector of his clinic. It was deplorable for the glory of Vienna that this exceptional man was forced to abandon his office in 1803, but pathologic anatomy found another home in Paris where it could grow beyond the scope of descriptive correlation of Morgagni into the rational science of medicine. Its fundamental aim of comprehending the anatomic lesion as the product of a morbid process was clearly conceived by the French school under the inspiration of Bichat, though it had already motivated John Hunter and those who followed him. This basic approach demanded a constant exchange of ideas originating in observations at the bedside and at the autopsy table. Rokitansky had absorbed this philosophy from his acquaintance with French and English literature, and he stressed in his inaugural address the necessity of a " close tie between the Pathologic Anatomic Institute and the hospital, between their directors, between anatomical findings and clinical observations " (p. 80). But beyond this requisite he is aware that " anatomic investigation based on unbiased observation " (p. 80) must govern this correlation. How necessary this regulative principle was is evident if one surveys the relation between clinical medicine and pathologic anatomy in Germany at the period in which Rokitansky began his career. It is true that the " reformatory mission " of morbid anatomy had been recognized by great minds, such as Laennec and Bright, but for the majority of the profession it provided only the satisfaction of confirming, rarely of correcting, the clinical

diagnosis. Johannes Müller [5] castigated this unscientific, casuistic trend of the times, Eble [6] illustrated it when he spoke of physicians "who enumerated in detail before the post mortem examination what particular organ changes it would, nay, must reveal." Rokitansky, convinced that "anatomic alterations of organs and tissues are obviously the result of processes" (p. 53), believed that "an exact knowledge of these results was indispensable for acquiring an insight into the nature of these processes and of the greatest importance for clinical medicine" (pp. 53, 54). He saw his efforts directed at two goals: "To organize scientifically the anatomic data of organ alterations and to create thereby a general pathologic anatomy; to show that, and how, these facts can be utilized for the diagnosis in the living patient" (p. 54). The development of pathologic anatomy as an independent branch of natural history was pursued by "assembling and organically connecting the observational facts according to an apperceptive principle tested by wide and integrated experience. From this emerges an anatomic didactic structure of pathology which offers by itself a vast amount of most knowledgeable data. Yet, it can be applied in a really fruitful manner only if it serves as the foundation of a general and special pathology" (p. 81). What was the apperceptive principle? Rokitansky gives the answer in different parts of his address. "It is the painstaking study with all the methods available to anatomic investigations of morphologic alterations according to tangible physical criteria; because soundest knowledge of morbid phenomena is gained by sensual perception of material appearances." [7]

This was the guiding principle for the descriptive classification of organ changes which he applied in his Handbook of Pathologic Anatomy. The modern student of pathology, taught to think in terms of biologic abstractions, might be inclined to disdain such a classification based on primitive sensualism. Rokitansky was not unmindful of the higher aims of general pathologic anatomy to explain the nature of the morbid

[5] J. Mueller, "Jahresbericht über die Fortschritte der anatomischphysiologischen Wissenschaften im Jahre 1833: 4. Pathologische Anatomie," *Arch. f. Anat. Physiol. u. wissensch. Med.*, 1834, pp. 162-201.

[6] B. Eble, *Versuch einer pragmatischen Geschichte der Anatomie und Physiologie vom Jahre 1800-1825.* Wien: Carl Gerold'sche Buchhandl., 1836, p. 42.

[7] It is well known that Rokitansky recognized the importance of chemical research for the advance of pathology. His Crasis Theory rests on attempts to demonstrate chemical alterations of the blood in general diseases. In this inaugural address he refers briefly to his hopes for the creation of an Institute "devoted to the chemical aspects of pathologic investigations" (p. 82). When finished in 1862, the new building carried the name: Pathologic and Chemical Institute.

processes. But he believed that the generalizing abstractions must be arrived at by concrete experience, speaking of their " justification according to the rules of [anatomic] discipline." Rokitansky's book, of which Virchow [8] spoke as the unsurpassed treatise of pathologic anatomy fifty years after its first publication, is today outmoded in its contents and inadequate for the second year medical student. But the instructor of pathology can profit by its perusal because it will teach him how he can guide his pupils " in the assimilation of facts and their application to a didactic system " (p. 80). And the didactic structure of pathologic anatomy aims at influencing clinical medicine. " Pathologic anatomy gives the picture of the course of disease " in its material substratum (p. 81), and " develops a physical diagnostic " (p. 81), or, as Klebs [9] expressed it, " Rokintansky taught us to think anatomically at the bedside and to weave at the autopsy table the individual phases of the morbid process into the pattern of the clinical progress." The essence of Rokitansky's teaching is his unequivocal avowal of making tangible the morbid process by recognizing the evolution of the anatomical alteration. This doctrine can be traced to Pinel and Bichat; it was advanced by Laennec and the French school of organicism. Rokitansky, however, not only expanded it by virtue of his immense autopsy experience but established pathologic anatomy as the didactic framework for pathology and clinical medicine. He was motivated in his studies by the urge for clear comprehension, " what is not clear is not science " [10] and could inspire the same endeavor among the younger professors of the Vienna faculty, Skoda, Hebra, and last but not least, Semmelweiss, whose great discovery rests on the anatomic identification of the morbid process of puerperal fever. Thus Rokitansky became the founder of the new Vienna school of medicine and beyond this the reformer of German medicine through a dynamic anatomic pathology. Today we are no longer aware of his great contribution; it has become common property and thus, as Sigerist [11] says, nameless. The publication of his autobiography and inaugural address should again focus our attention on Rokitansky, not only for the sake of historical justice, but

[8] R. Virchow, *Hundert Jahre allgemeiner Pathologie.* Berlin: August Hirschwald, 1895.

[9] E. Klebs, *Ueber die Umgestaltung der medicinischen Anschauungen . . .* Leipzig: F. C. W. Vogel, 1878.

[10] Quoted from M. Neuburger, " Rokitansky als Vorkaempfer der mechanistischen Forschungsmethode und der idealistischen Weltanschaung." *Wien. klin. Wchnschr.*, 1934. *47*: 358-360.

[11] H. E. Sigerist, *Grosse Aerzte.* Muenchen: J. F. Lehmann, 1933.

because he has a message for us. I repeat, the autobiography and inaugural lecture are not easy reading; Rokitansky was not an articulate writer. But they offer us the opportunity of tracing the process of his thought which so materially contributed to our present knowledge. I believe every instructor of pathology should test his own attitude to teaching and research on the method which guided Rokitansky in his time. Are not his words a challenge for every devoted teacher when he says (p. 82): "It seems incumbent upon me to discuss briefly how I deal with the acquisition of facts and their utilization to erect a didactic system, in order to justify the direction I have taken in my own education." His own education. Indeed, he was his own preceptor, not as fortunate as Rudolf Virchow who could call Johannes Müller his master. And so emerges through Erna Lesky's contribution the picture of Karl von Rokitansky, the great teacher of a great discipline of great medicine.

MEDICO-HISTORICAL NEWS AND ACTIVITIES

CORRESPONDENCE, REPORTS, AND QUERIES

ANIBAL RUIZ MORENO
1907-1960

A few days before Christmas last year Professor Aníbal Ruíz Moreno died suddenly of a heart infarct, in Buenos Aires. He was born in Córdoba (Argentina) in 1907 and had distinguished himself throughout his medical career both as a practising physician, specialising in the treatment of rheumatism, and as a scholarly teacher of medical history. At the time of his death Ruíz Moreno was President of the International League against Rheumatic Diseases (elected at Toronto in 1957), and Professor of the History of Medicine at both the Universidad de Buenos Aires and the Universidad de La Plata.

Dr. Ruíz Moreno took his first steps into medical history in 1937, when he became associated with the Chair of the History of Medicine in the Medical School of the University of Buenos Aires. After the death of Professor Beltrán in 1947, Ruíz Moreno was appointed to the Chair, and he was Chairman of the Department from 1948. In this capacity he continued the teaching as well as the publications of that institution (from volume XII [1948] to XIX [1959]), despite the political crisis which affected medical education in Argentina. At the regular course in the History of Medicine at Buenos Aires, Professor Ruíz Moreno presided at an average of 30 classes and gave more than 12 classes at La Plata. In addition to this busy academic schedule, his agenda was always crammed with lectures and conferences on medical history, together with post-graduate courses on rheumatic diseases and on the history of anatomy, psychiatry, and other medical specialties. Moreover, Dr. Ruíz Moreno, in common with the staffs of all medical schools in South America, was obliged to devote additional effort to keeping up an extensive medical practice.

Aníbal Ruíz Moreno was also a very active author in the field of medical history, rheumatic studies, and historical fiction. He published Spanish versions of Galen's works (1947), the treaties of Rhazes on Smallpox and Measles (1948), the *Regimen Sanitatis Salernitanum* (1951), and he was working on further translations of Galen and Fracastoro's *De Contagionibus,* which were left unfinished. Ruíz Moreno published several monographs devoted to medical knowledge relating to rheumatism in works by Hippocrates (1941), Sydenham (1943), Paré (1944), Baillou (1944), St. Isidore (1950), Seneca (1954), and Rufus (1954). The local scene was by no means neglected, and in other works Ruíz Moreno described the fight of the Jesuits to reduce alcohol intoxication during the Colonial Period (1939), the introduction of vaccination to America (1945 and 1947), and the work of the Protomedicate in Buenos Aires (1949). He produced further monographs on General San Martín (1950), Aimé Bonpland (1950), and Vertiz (1959), and on a medical analysis of the Spanish mediaeval *Corpus Juris Civilis* (1956). Altogether Aníbal Ruíz Moreno published 29 books or monographs and 61 papers on

various aspects of medical history; to this impressive total should be added his standard work on Rheumatism, which was first published in 1936 and is now in its 7th edition, and more than 160 papers relating to rheumatic diseases. Of late years, Ruíz Moreno became increasingly interested in classical history, and among the works left unpublished at his death is an interesting historical novel dealing with Roman civilisation, early Christian effort, and the influence of Seneca.

Ruíz Moreno was an enthusiastic traveller and was familiar with the major historical sites in Europe and the Americas. In 1940 he visited the Institute of the History of Medicine at the Johns Hopkins University, and in 1949 and 1959 he went to the Historical Medical Library at Yale. He was also acquainted with the historical medical libraries at Cleveland and a number of others in many countries. When visiting libraries and medical museums he never allowed fatigue to overcome him, and he was well known for the large quantities of aspirin he would swallow in order to help him complete his ceaseless rounds. Ruíz Moreno was a learned and eager scholar and a teacher of the greatest integrity. His death leaves in Argentina an empty place which will be exceedingly difficult to fill.

Dr. Ruíz Moreno belonged to an important family of Buenos Aires, whose members are associated with many fields—medicine, diplomacy, and administration. He leaves a widow, Doña Luisa Allende de Ruíz Moreno, and four children, one of whom has already qualified as a physician.

F. GUERRA

QUERIES [1]

Answer to *Query* 1 (*Bull. Hist. Med.*, 1961, *35*:277): Isaac Newton certainly falls into this category. According to S. Brodetsky's biography (J. Luce & Co., Boston, 1928, pg. 5) Newton was ". . . born prematurely, diminutive in size, and sickly. . . ." I have not been able to discover what Newton's birth weight was, but the fact that both Brodetsky, and Bell (Men of Mathematics) make reference to his "premature" birth adds significance to Pope's couplet: "Nature and Nature's laws lay hid in night: God said, Let Newton be! and all was light."

Gilbert B. Forbes, M. D., Professor of Pediatrics
The University of Rochester, School of Medicine and Dentistry

Query 3: Who is the author of: "The way to a long life is to contract a chronic disease and take care of it."? This quotation may not be correctly worded but seems remindful of Oliver Wendell Holmes or Osler.

[1] Queries deemed sufficiently pertinent by the Editor will be published anonymously here. Answers should be sent to the Editor who will forward them to the questioner and will select those suitable for publication over the name of the correspondent.

ANNOUNCEMENTS

NATIONAL NEWS

Library of Congress

The papers of the American physiologist, Dr. Jacques Loeb (1859-1924), were recently presented to the Library of Congress by his children, Dr. Robert Loeb, Dr. Leonard Loeb, and Mrs. Anne Osborne. Dr. Loeb is best known for his experimental work in inducing parthenogenesis and regeneration by means of chemical stimuli and for his development of the tropism theory.

Among the approximately 10,000 pieces of correspondence are letters exchanged between Dr. Leob and his fellow scientists. There is also a large collection of Dr. Loeb's experimental notebooks and manuscripts and proof sheets of his books and articles. After the papers have been organized, they will be available for research purposes in the Manuscript Division.

The microbiologist and discoverer of antibiotic streptomycin, Dr. Selman Waksman, recently presented a group of his personal papers to the Library of Congress. Among the 1,200 pieces of correspondence, dating from 1916 to 1959, are letters from Dr. Jacques Loeb, George W. Merck, Sir Alexander Fleming, Albert Einstein, Paul W. Burkholder, and René Dubos. The papers also include a typewritten transcript of Dr. Waksman's unpublished lectures and addresses. When the papers have been organized, they may be consulted in the Manuscript Reading Room.

Missouri

The 1961 Arthur Rochford McComas Medical History Essay Contest, established in memory of Dr. Arthur Rochford McComas of Sturgeon, Mo., has been won by William G. Ridgeway, a student in the University of Missouri School of Medicine, class of 1961, for his essay on "The Ocular Problems of Some Famous Men."

National Library of Medicine

The National Library of Medicine *News*, vol. XVI, no. 7, July 1961, announces the following personnel changes:

Dr. Dorothy M. Schullian, who has served with distinction at the National Library of Medicine since she entered on duty on June 1, 1944, successively as librarian, curator, historian, assistant chief, and most recently as Chief of the History of Medicine Division in Cleveland, is leaving the employ of the Library in August. After a visit to Italy she will assume her new duties this fall as Curator of the History of Science Collections of Cornell University Library in Ithaca, New York.

Dr. John Blake will enter on duty in September as Chief of NLM's History of Medicine Division. Dr. Blake is at present the Curator of the Division of Medical Sciences, Smithsonian Institution, and is serving as Secretary-Treasurer of the

American Association for the History of Medicine and as a member of the History of Medicine Study Section of the National Institutes of Health.

The *Bulletin* extends best wishes to Dr. Schullian and Dr. Blake for success in their new activities.

University of Pittsburgh

The Graduate School of Public Health of the University of Pittsburgh announces the recent acquisition of the Wilson G. Smillie Collection. This collection, which is the gift of Dr. Smillie, consists of over 300 volumes, many of which are medical classics, plus a number of pamphlets, holographs, and pictures. In addition, the School has acquired from the National Archives microfilmed copies of a large part of the National Board of Health Records.

Wisconsin

A new Museum of Medical Progress in Prairie du Chien, the result of many years of planning, opened September 1, 1960, for two months, reopening for its regular season, May 1 to November 1, 1961. Housed in the restored military hospital of Old Fort Crawford, scene of William Beaufort's experiments, the Museum is operated as an official state historic site.

Death

The *Bulletin* notes with regret the death of Mr. Albert Deutsch, best known to medical historians through his book, *The Mentally Ill in America.*

NEWS FROM ABROAD

England

The *Bulletin* is distressed to hear of the death of Mr. William J. Bishop, Editor of *Medical History* and author of well-known books and articles in the history of medicine.

Germany

The German Society for the History of Medicine, Science, and Technology will hold its annual meeting at Augsburg, September 16-20, 1961.

BOOK REVIEWS

CHARLES LICHTENTHAELER. *Sur la vocation universitaire de l'histoire de la médecine.* (Leçon inaugurale.) *Le troisième Epidémique d'Hippocrate vient-il vraiment après le premier?* (Sixième étude hippocratique.) Geneva: E. Droz; Paris: Minard, 1960. 74 pp.

In his inaugural lecture at the university of Lausanne, the author complains that physicians everywhere are neglecting their tradition and especially the history of their own profession. No other scientific group shows such a high degree of disregard of the past. "The medical historian remains isolated in spite of his efforts" (p. 17).

Lichenthaeler regards himself as the only living physician able to analyse critically the Hippocratic writings (p. 18). He regrets that nobody has specialised in critical work on Galen, not even a philologist. This view cannot be maintained since some work on Galen has been done in the past years in Germany and in the Americas, although one can agree that not enough of Galen's important work has been reviewed by contemporary historians. Lichtenthaeler's argument is that reconstruction of the past should be the goal of the historian of medicine. The past should not be treated merely as a stepping stone to modern achievements. History of medicine should form a basis for higher objectivity in the discussion of modern achievements. His approach is to be commended. But the referee would like to see a greater consideration for the teaching of the history of ideas and the evolution of medical concepts.

As to the second portion of the publication, the author shares the accepted opinion that the Third Book of Hippocrates' Epidemics was written by the same person as the first and, most likely, by Hippocrates himself. Lichtenthaeler refutes a recent thesis written by Weidauer, 1954, supporting a divergent opinion (p. 29).

Lichtenthaeler's argument is based on the following points: Book III exhibits more archaic expressions than Book I. Book III is reminiscent of an ontological approach to the problem of illness. Disease is considered an entity in itself. Illness is supposed to attach itself to some part of the affected body and, spreading its influence, to destroy it (p. 33). This idea is further supported by numerous etymological deductions too detailed to be discussed here.

Not all of these points appear convincing. But Lichtenthaeler describes Book I as proof of a more clinical approach and gives priority to Book III because of its more primitive character. The nosology and scientific theory of Book I appear comparatively more advanced. The prognosis and etiology are based on clinical, not superstitious, concepts. Yet, Lichtenthaeler concedes that none of his arguments are strong enough to prove his thesis. They appear to him unconvincing if considered one by one, more favorable if considered in their totality. Moreover, Lichtenthaeler admits that one could advance exactly opposite conclusions (p. 47).

The paper is difficult to read, even for somebody familiar with Hippocrates, because of the ponderous amount of detail in the form of quotations and references. I would agree with the conclusions of the author that the "results of this investi-

gation remain probable, perhaps very probable, and not certain. We could find decisive proof neither for the chronology, nor for the authenticity, of the treatises, nor for the view that they were written by one author only" (p. 64).

Lichtenthaeler considers the study of Hippocrates worthwhile because of the magnificence of his writings: "Many facts which we have understood escaped the attention of Galen himself" (p. 66). "We are near to achieving a state of knowledge concerning these two treatises which is close to that of the first disciples of Hippocrates himself" (p. 66).

Looking back at the two treatises of Hippocrates after more than 2000 years one would wish to minimize the problem of the time which may have escaped between the composition of the two works. One would prefer to see such an experienced student of Hippocrates as Lichtenthaeler try to connect the ancient accounts with later, and even contemporary, descriptions of similar diseases. This would shed some light on the understanding of ailments described by Hippocrates for the first time in history and on the development of clinical concepts. Since style and arrangement in each of the two treatises change frequently, one is tempted to ask how much of the arrangement is due to Alexandrian compilation. The great caution displayed by Dr. Lichtenthaeler in the evaluation of his conclusions can only be commended.

R. E. SIEGEL

NEAL W. GILBERT. *Renaissance Concepts of Method.* New York: Columbia University Press, 1960. xxvi + 255 pp. $6.00.

A book such as the present excellent study, central to the history of ideas generally, is far more difficult to write than its modest title might at first blush indicate. For it must concern itself with several things which are distinct and yet which develop as coordinates related to one another in a great confusion of ways through history. It deals with, first, the concepts which we designate by our term method today, secondly with the history of the term *methodos* and its cognates, and thirdly with aspects of the history of methodology itself, of what men do when they think they are employing "method"—in any of its protean senses—in their affairs.

By method today we usually mean a plan of action guaranteeing speed and efficiency in achieving a goal. The ancient Greek term *methodos*—based on the concept of a "way" or "road" (*hodos*) and meaning at root a "way after"—from the beginning involves a germ of our present concept, for it refers to some sort of plan. But the stress on speed and efficiency which seems so inevitable to us develops only at the time of the Renaissance, although with certain medieval supports, and even in the Renaissance appears slowly and at first ambiguously. The earlier concepts designated by *methodos* and its cognates had had to do not with action executed in an efficient succession of steps but chiefly with the internal organization of a subject of academic instruction (here *methodos* was virtually synonymous with a "doctrine" or body of teaching) or with modes of commuication or debate. Since medicine was the first activity among the Greeks to be elaborately rationalized as a subject of instruction, method became a particular

specialty of writers on medicine, notably Galen, and gave its name to groups of medical men known as "methodists."

After treating circumstantially the ancient and medieval sources of Renaissance thinking on "method," Professor Gilbert plunges into the Renaissance itself. Here humanists struggle with scholastics and with one another and, curiously enough for men of letters purportedly uninterested in technology, help associate "method" with speed and efficiency through their preoccupation with improved educational procedures. The pivotal Renaissance figure is, of course, Peter Ramus, the vociferous anti-Aristotelian of sixteenth-century Paris who secured an almost incredibly numerous following in northern Europe. After Ramus, the story of method settles down largely to struggles between his followers and the northern Aristotelians, and to less polemic developments among the Italian Aristotelians such as Aconzio, Zabarella, Piccolomini, and Mazzonius, who were relatively undisturbed by the gigantic Ramist flurry. On both sides of the Alps, however, Galen's treatment of method was often the *pièce de résistance* for discussion.

The present book illuminates not only the history of method and methodology but also many related areas of study, some of them sweeping. It underlines the profound influence of medical writers on the main currents of Western philosophy and brings out the dismayingly detailed and profound familiarity with ancient philosophers, including many who are mere names today, displayed by Renaissance thinkers.

Gilbert makes clear that the titanic quarrels about method preceding Descartes stemmed not from disagreement over issues but from a conflict of purposes, since one group of writers was concerned with "efficiency of teaching and the application of the useful arts to life" and the other, the scientific, group with procedures for strict demonstration and proof. "The two purposes clashed in logic because logic could be regarded as an art or a science, . . . useful both in speaking and in scientific analysis." Among the developments illustrative of this conflict of purposes there is one not noted by Gilbert which perhaps deserves special mention. This is the way in which Sturm, Melanchthon, and Ramus, humanists interested in efficient teaching methods and in "useful" arts, succeeded during the 1540's in grafting onto logic textbooks the section on "method" which thereafter was commonly taken for granted as an integral part of logic but which derived not from formal logic at all but from the practically oriented study of Greek oratory and of letter-writing! This development is reported in my *Ramus, Method, and the Decay of Dialogue*. Here the teaching-utilitarian tradition disguises part of its heritage as strictly demonstrative, "scientific," proof and thereby sets the scene for Descartes.

The Renaissance concepts of method which Gilbert treats are almost entirely those discernible in rationalized discussions about method among philosophers (many of whom were also medical men). Alongside such discussions there are evident in the same age other developments affecting concepts of method through operational approaches to nature which were methodologically new although they were developed with little rationalized discussion of "method" as such. Through our growing knowledge of the history of science and technology we know something of such approaches, often devised by the artisan-scientists of the prototechnological sixteenth- and seventeenth-century world. It remains for subsequent studies to

relate more fully the work of these artisan-scientists to the academic discussions of method so ably recounted and explained here by Professor Gilbert. This work not only answers a great many important questions but also opens many highroads to further research.

WALTER J. ONG

JEROME M. SCHNECK: *A History of Psychiatry.* Springfield, Illinois: Charles C Thomas, 1960. ix + 196 pp., Ill. $5.50.

There seems to be a growing interest in the history of psychiatry. Three books on this topic were published in this country within the past four years: Mark D. Altschule's *Roots of Modern Psychiatry,* in 1957; E. Ackerknecht's *A Short History of Psychiatry,* in 1959; and now this *History of Psychiatry* by J. M. Schneck. Each of these books has its particular flavor and merits. To this reviewer Schneck's work seems to be less controversial, less challenging, and less captivating than the other two. Yet, for this very reason, it should prove to be especially helpful to the psychiatric resident, who seeks a "factual," unbiased introduction to the history of his chosen field, or who needs to refresh his memory for the Specialty Board Examination. Beginning with the archaic past, the book relates in twelve chapters the important events and outstanding "names," their contributions and formulations, their ideologies and their influence; often brief evaluations by the respective contemporaries, or by succeeding writers, and by the author himself, are added. In chronological order, though without undue adherence to it, the author follows the development of psychiatry through the Greek and Roman periods, the Middle Ages, the Renaissance, and the centuries since the seventeenth, right up to the middle of the twentieth. The author is quite aware of the inherent impossibility of dealing with contemporary psychiatry from a historical viewpoint, and he avoids any biased emphasis on this or that "school," stressing rather the apparent need for a more comprehensive psychiatry and the goal to "rise above the tides and pressures of contemporary conformity." Because of the author's well known interest and experience in hypnosis, this topic is discussed at comparatively great length. On the other hand, this reviewer missed any reference to the research in genetics, to E. Kretschmer's constitutional approach to psychiatry, and to the role of "Cybernetics" and "communication psychiatry." Each chapter of the book is followed by a list of well chosen references, though this reviewer thinks that *The Great Physiodynamic Therapies,* edited by Arthur M. Sackler and others, deserved to be mentioned in the list to the 12th chapter.

WALTER O. JAHRREISS

LEW A. HOCHBERG. *Thoracic Surgery Before the 20th Century.* New York, Washington, Hollywood: Vantage Press, Inc., 1960. 858 pp., Ill., $15.00.

Henry E. Sigerist wrote, "The history of medicine can be written by professional historians, whose task it is to find sources, make them available, investigate them, in order to recreate the past in history. Much valuable work has been done in this way. But the history of medicine can also be written by men whose fields of activity are the practice of medicine. Studies of this kind will perhaps not be quite so accurate as far as historical methods are concerned, but they certainly are very attractive, and can have a great influence because of the personality of the writer."[1] This comment is strikingly descriptive of the book under review. From the historiographical point of view it leaves much to be desired. Inaccuracies, omissions, indiscriminate selection of material, meaningless repetitions, lack of references to bibliographical sources, and a certain naiveté in style and approach indicate its "non-professional" authorship. On the other hand, the zeal and industry displayed by its writer, his enthusiasm for the subject, and competence and familiarity in the field of medicine whose evolution is being traced, compensate in great measure for the defects listed. Dr. Hochberg, himself a thoracic surgeon, writes that he has been collecting material on the history of his specialty for twenty years. The prodigious energy exerted in this study is indicated by a bibliography which covers over 80 pages.

Early thoracic surgery, which goes back to the beginnings of medicine, was limited to the management of injuries of the chest and the treatment of empyema. The diagnosis of the latter condition and its operative approach are well described in the Hippocratic writings. Little was added in the ensuing centuries, and in keeping with this, the entire period from the dawn of medicine to the end of the 15th century is dealt with in this book in a brief initial chapter. This is followed by a discussion of thoracic anatomy in Medieval and Renaissance art and medicine. Separate chapters are devoted to the 16th, 17th, and each half of the 18th centuries. The developments during these three hundred years were modest, indeed. Progress was made only in the drainage of suppurations of the lung as well as of the pleural cavity, and in the removal of foreign bodies from the trachea and esophagus by instrumentation and, occasionally, by operative incision.

Because of the enormous advances made during the 19th century, which exceeded all that had been scored during the preceding millennia, this period is given a proportionately large amount of space. Separate and lengthy chapters are devoted to injuries, empyema, pulmonary suppurations, tuberculosis, diaphragmatic hernia, esophageal surgery, and cardiovascular surgery. By the end of that century the groundwork had been thoroughly laid for the remarkable developments of our own era. Aspiration of pleural fluid accumulations, thoracoplasty and pulmonary decortication for chronic empyemas, pericardial drainage and cardiolysis for constrictive pericarditis, operations for hernias through the diaphragm, suture of wounds of the heart, and wiring plus electric coagulation of aortic aneurysms, all significantly widened the field of thoracic surgery.

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[1] Foreword in Theodor Billroth: *Historical Studies on the Nature and Treatment of Gunshot Wounds from the Fifteenth Century to the Present Time.* Trans. by C. P. Rhoads. New Haven, Conn.: Nathan Smith Medical Club, 1933.

A chapter on non-surgical contributions to the advancement of thoracic surgery concludes this work. Here are discussed percussion, auscultation, antisepsis, anesthesia, vital capacity, peroral endoscopy and X-rays. Except for the brief section on vital capacity, the subject of the physiology of circulation and respiration, so important to the surgery of the chest, is regrettably almost totally omitted. The history of any phase of medicine cannot be considered complete without relating its development to the growth of the medical sciences as a whole.

The author informs us that he is presently at work on a second volume which will deal with the developments in thoracic surgery during the 20th century, publication of which is planned in 1963. This should prove to be a welcome addition. Despite its shortcomings, the present volume will be of interest, particularly to surgeons; and will serve as a valuable source of reference for future writers concerned with the history of thoracic surgery.

LEO M. ZIMMERMAN

A Way of Life and Selected Writings of Sir William Osler. With an introduction by G. L. Keynes. New York: Dover Publications, Inc., 1959. xx + 278 pp., Ill., $1.50.

In connection with the centenary of Osler's birth which had just been celebrated in 1949, the Osler Club of London in 1951 brought out a collection of sixteen of Osler's best essays, addresses, and speeches; not all of them were the best known ones and some were a little hard to find. This Dover paperback edition is an unabridged and unaltered reproduction of the work published for the Osler Club by the Oxford University Press in 1951. Almost any excuse is reason for reading or rereading these essays. Though I had read the 1951 edition with pleasure, I was happy to see the new Dover reprint cheap enough to put the book into the hands of every student of medicine. In fact anyone might skip a meal and buy this rich fare for the spirit. Reading these papers again strikes me more than ever with Osler's omnivorous reading, retentive memory, and the warm enthusiasm he was able to generate apparently with little or no effort. He seemed to have complete mastery of time and never allowed himself to be trapped by pressure, pleading, or demands of the world's chronophages, who naturally shared the general admiration and acclaim and crowded about him whenever possible. How he managed to escape their clutches even while making them think that they were being singled out for special treatment is one of the grand mysteries about Osler. Throughout these essays and addresses Osler's debonair and blithe spirit certainly is visible, but one senses also a well, but not completely, suppressed strain of wistful melancholy, of some deep and pervading sorrow, for I feel that Osler was a man who in his work and in his life "whistled that he might not weep."

WILLIAM B. BEAN

THE BULLETIN RECENTLY RECEIVED *

Ricardo Archila. *Historia de la medicina en Venezuela, Epoca colonial.* Caracas: Tipografia Lux, S. A., 1961. 28 pp.

Brompton Hospital Reports. Vol. XXIX, 1960. London: Lloyd-Luke (Medical Books) Ltd., viii + 261 pp. Ill. 15s.

Ed. Frison. The belated construction of water-immersion objectives in Britain. Reprinted from the *Journal of the Quekett Microscopical Club,* Series 4, vol. V, no. 13, February, 1961, pp. 349-357.

Luis S. Granjel. *Estudio historico de la medicina.* Lecciones de metodologia aplicadas a la historia de la medicina española. Salamanca, 1961. 177 pp.

N. Paul Hudson (Editor). *The Ohio State University College of Medicine,* Volume II, 1934-1958. Columbus, Ohio: The Ohio State University, 1961. xiii + 456 pp. Ill.

Esmond R. Long. *Selected Readings in Pathology.* Second ed., Springfield, Ill.: Charles C Thomas, 1961. ix + 306 pp. Ill. $8.50.

Medical Department, United States Army. *Preventive Medicine in World War II.* Vol. V: *Communicable Diseases Transmitted through Contact or by Unknown Means.* Washington, D. C.: Office of the Surgeon General, Dept. of the Army, 1960, xxxiii + 530 pp. Ill. $5.75. [For sale by the Superintendent of Documents, Washington 25, D. C.].

F. N. L. Poynter (Editor). *The Evolution of Medical Practice in Britain.* London: Pitman Medical Publishing Co. Ltd., 1961. vi + 168 pp. 25s.

John B. Runnels, George F. Sheldon. *A Pictorical History of Kansas Medicine.* 1961. 32 pp. Ill. $2.00 (obtainable from the Student Union Bookstore, Kansas University Medical Center).

Henry E. Sigerist. *A History of Medicine,* Volume II: Early Greek, Hindu, and Persian Medicine. New York: Oxford University Press, 1961. xvi + 352 pp. Ill. $11.00.

P. van der Star (Conservator). *Catalogus: Uit de kinderjaren van de elektriciteit.* De geschiedenis van de elektriciteit van 1600 tot ca. 1831. Leiden: Rijksmuseum voor de Geschiedenis de Natuurwetenschappen, 1961. 28 pp. fl.O.50.

Cecil Striker (Comp.). *Famous Faces in Diabetes.* Boston: G. K. Hall & Co., 1961. xi + 256 pp. Ill. $25.00.

Giuseppe Struzio. *Dell'arte sfigmica, libri V.* Aggiornamenti di sfigmografia e commento cardiologico di Giorgio Invernizzi. Traduzione, introduzione e note storiche di Carlo Castellani. Milan: Edizioni "Minerva Medica," 1961. ciii + 599 pp. Ill.

Margaret H. Thomson. *Le jardin symbolique;* texte grec tiré du Clarkianus XI. Paris: Société d'Edition "Les Belles Lettres," 1960. 97 pp.

Rustom Jal Vakil. *The Romance of Healing and Other Essays.* New York: Asia Publishing House, 1961. xii + 187 pp. $6.95.

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* The *Bulletin* reserves freedom of decision as to the publications to be listed in this section. Items received, other than those assigned for review, are ultimately incorporated into the collection of the Institute of the History of Medicine.

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